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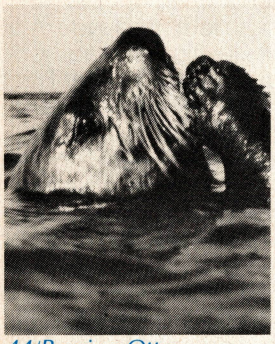
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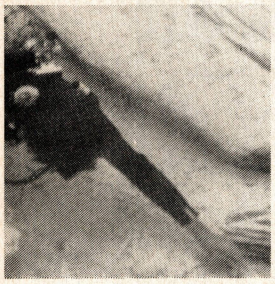


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Cover – Diver Frankie Hebert, an Air Micronesia stewardess and accomplished diver, is examining a colony of soft corals growing on the mast of the sunken Japanese tanker, Shinkoku Maru, *in Truk Lagoon. Photo taken by Paul Tzimoulis with a Nikonos II, Seacor 21mm lens, Subsea 150 strobe at a depth of 30 feet.*

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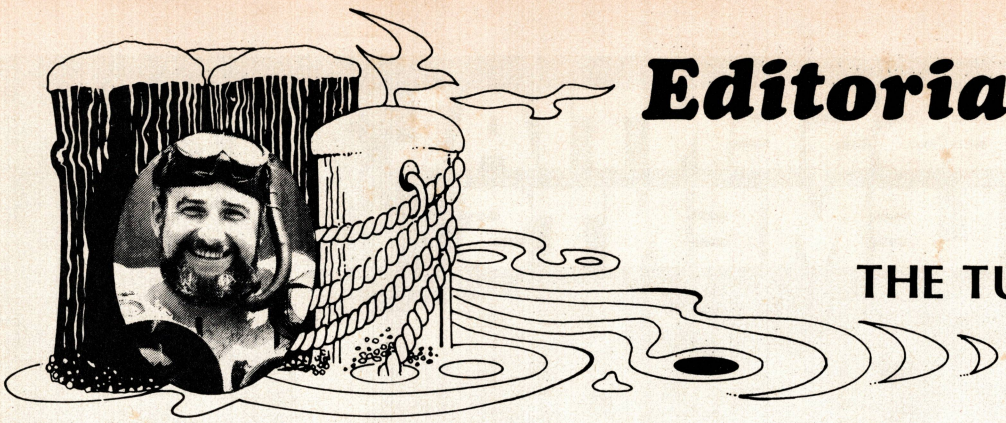
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Editorial

THE TURNING POINT

by the Publisher

A recent meeting between Los Angeles County officials and the National Scuba Advisory Committee could very well go down in history as another milestone in the evolution of sport diving. Unlike the previous emotion-charged hearings, this conference was conducted in a professional, factual manner. For the first time, there appeared to be constructive dialogue between county government and the leaders of diving.

Supervisor Kenneth Hahn, host for the conference, made it clear that the intent of the new diving law was not to harm the sport in any way, but instead to protect the innocent non-diving public from the possibility of unsafe scuba training. Not insensitive to the problems created by the Diving Ordinance, Parks & Recreation Department officials expressed sincere concern over the apparent damage being caused to the diving industry. An avalanche of complaint letters from irate divers and people within the diving business had not gone unnoticed.

Although the Ordinance does not officially go into effect until July 1st, it has already caused a severe impact on the diving industry, possibly amounting to a loss of 2 million dollars. Jon Hardy, general manager of NAUI, reports that public confidence in scuba training has been shattered. The uninformed, non-diving public has been badly frightened by lurid newspaper stories, and passage of the County Ordinance served only to confirm their worst fears. Enrollment in scuba classes is way down, with many scheduled courses cancelled or running half empty. The Charter Boat Owners Association (a group of ten dive boats) reports a total of 61 scheduled dive trips was cancelled in a little more than four months. The dive shops simply could not get together enough people to make a trip. This picture is in sharp contrast to last year, when the same boats were booked solid weeks in advance of their scheduled trips.

Ralph Shamlian, DEMA committee chairman, reports that dive shop business in the Los Angeles area has slumped to an all time low. Equipment sales are practically nil, and the area could easily be described as a "disaster zone." This loss of business cannot be blamed on the nation's depressed economy because shops in other parts of the U.S. are doing fairly well. Scuba stores in New England, New York, and the Florida Keys are reporting increases in sales of ten percent or more over last year.

Morale among scuba instructors in the L.A. area is equally poor. They are caught in the middle, forced to comply with the forthcoming regulations, but not liking it one bit. There is much confusion and bitterness over the new procedures, and reluctance by many instructors to participate in the "emergency recertification" program. Many instructors may stop teaching because of this.

Worst of all, the diving public is infuriated by the new law. They regard the Ordinance as a personal insult upon their intelligence and capabilities as qualified divers. They feel cheated out of the money, time, and effort taken to become trained and certified in the first place. All of this training has been made invalid by government decree. It is possible the Ordinance may end up having a reverse effect on the diving public, and may contribute towards increased delinquency among Los Angeles divers.

On the other hand, the Ordinance has produced several interesting and beneficial effects on the diving industry as a whole. Its very existence has awakened divers to the vulnerability of their sport. Restrictive legislation and government control is no longer a fantasy — it's a fact of life. The diving industry has come to realize there is a crucial need for voluntary self-controls, and they are taking steps to "clean house".

The four national certification agencies (NAUI, NASDS, PADI & YMCA) have ceased squabbling among themselves, and have begun to take steps towards a more unified system of quality control in training. The Ordinance has motivated them to form the National Scuba Training Council, and they are hard at work developing realistic training and certification standards. They've also developed a new intra-agency report form for instructors who have been suspended for violation of safety standards. Instructor Ethics Committees have grown stronger, more active, and are busy reviewing complaints against instructors.

The problem of poor scuba training in the L.A. area high schools has been completely cleaned up, long before the Ordinance became law. And it is unlikely that such a situation could ever again develop, as the certification agencies now have stringent safeguards.

The Ordinance has also helped to accelerate funding and expanded efforts in the area of diving accident investigation. New approaches to the problem are currently being developed. A way must be found for accurately comparing the number of diving accidents against the number of actual dives made in the L.A. area in order to determine just how safe or unsafe diving really is. Deeper probing will also be made into the basic causes of such accidents, and how divers can avoid such situations in the future.

Meanwhile, the diving industry is hard at work in developing new instructor aids and training systems which will insure quality instruction and course continuity. For example, Scubapro has just introduced their Demand Educator, a revolutionary scuba training course on video tape. Scuba training-by-television helps eliminate any omission of vital information, since the basic lesson plan is completely pre-recorded and cleverly illustrated. Similar training programs, utilizing different audio visual equipment, are being developed by the Jeppesen Company and by Bergwall Productions, Inc., both professionals in the educational aids business.

But perhaps the most significant outcome of the Ordinance has been the formation of the National Scuba Advisory Committee itself. The people in our sport have come to recognize the critical need for a strong voice which can represent the diving public as well as the commercial interests. We must organize ourselves if we are to convince the government that we can effectively police our own industry.

If it were not for the Scuba Advisory Committee, there wouldn't be any possibility of negotiation with L.A. County officials. And county officials were so impressed with the Committee's arguments that they have requested a detailed report on effects of the diving law to date.

Let's hope the L.A. County Board of Supervisors sees the wisdom in repealing County Ordinance No. 11037. It has already accomplished the task it was originally designed for. The diving industry has paid dearly for this lesson and there's no need to prolong the punishment.

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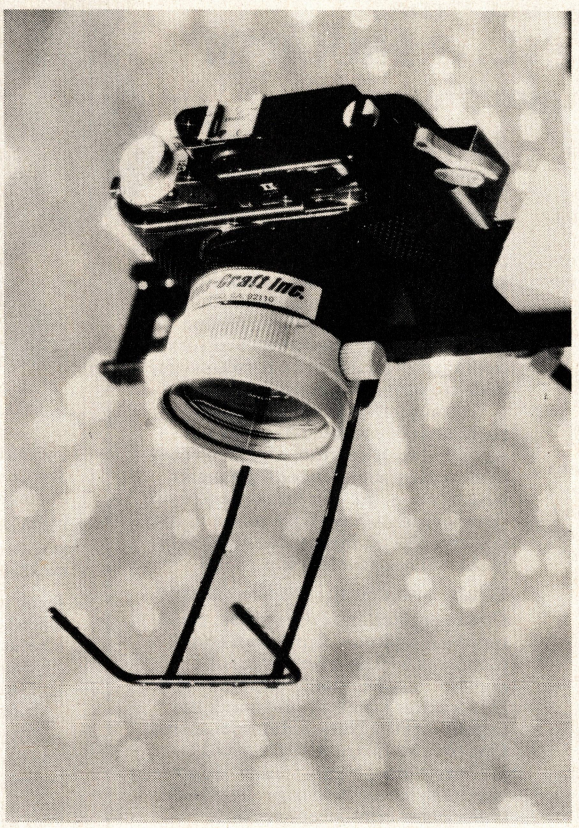
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Driftwood

. . . Having subscribed to your fine magazine for roughly one year, I couldn't understand why a product report on the "Sea Way Shark Shooter" was published. This confusion was supported by a basic understanding that SDM was opposed to spearfishing. Though we aren't really dealing with actual "spears" in this case, I think both fit under the same category. The shark, granted, is an unpredictable creature, I believe an alternative to a 12 gauge shotgun could have been tested. Such devices as chemicals, high or low frequencies, or even tranquilizers could have been introduced. Killing is not the answer to safe diving in shark infested waters. Common sense and researching are. Please take a stand on whether or not you are really opposed to spearfishing . . .
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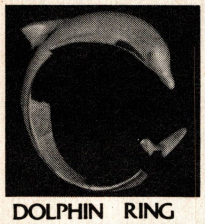
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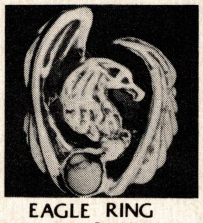
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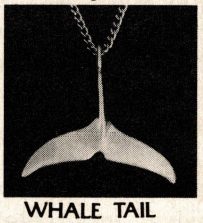
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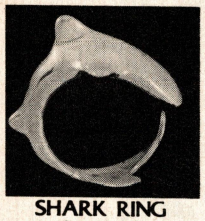
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Driftwood

. . . In a recent article, "Ocean Dumping Expose," many facts about dumping of chemicals and other harmful debris was discussed. I find it highly ironic that such agencies, as the Federal Environment Protection Agency would allow such poisonous chemicals as mercury and cadmium, to name only a few, to be dumped into coastal waters. It's not only ironic, but disgusting!

. . . It's sad in these times of so much shortage that the American people can not trust our federal agencies to provide the healthiest possible environment, both on land and water. I think American people should be kept aware of such hazards we face every day. I commend you on writing, publishing Mr. Barada's article, and encourage more articles concerning marine inhabitats.

MAUREEN DOHERTY CHICAGO, ILL.

. . . The lesson of Los Angeles has fallen on deaf ears in Florida! My buddy and I took a mid-April diving vacation to the springs and caves . . . area. We needed to rent extra tanks and visited a local dive shop where we rented the tanks, bought some literature on local dive sites and received directions to a few nearby U/W caves. The guy asked for my money and driver's license as security on the tanks but never asked for my C-card. When I brought it to his attention he shrugged and still did not ask for the C-card. Meanwhile, my buddy is loading the tanks in our car and he was not asked by the other store operator who checks out the tanks. Just that day we heard on the radio that three dead divers were removed from one of the local caves.

Your editorials keep screaming for self-regulation by the scuba industry and the sport divers but who is listening? Florida is the most vulnerable state for the next bureaucratic onslaught of restrictive legislation . . . Protecting the industry and avoiding the hassle of restrictive laws are worthy goals but they are miniscule when measured against the goals of safety in diving . . .

STANLEY CAMPBELL
CINCINNATI, OHIO

. . . I have gotten your magazine for two years now. I enjoy reading it. In your Divers Directory under Penna. there is only one dive shop around me that gives lessons. I would like to take scuba lessons. If any teacher is reading this and lives in Pittsburgh, please write me . . .

RANDY OLMSTEAD
259 MCKENZIE DR.
PITTSBURGH, PENNA. 15235

LOOK GOOD IN THE DARK

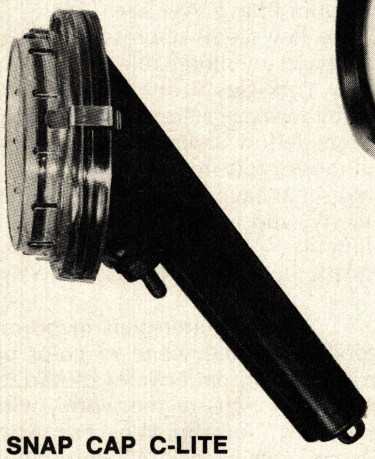


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JUL-SD

Driftwood

. . . For being one of the leading diving magazines, SKIN DIVER is well behind the times. This month your magazine just got around to mentioning that California is "investigating" diving legislation. Well California State Assembly Bill 515 . . . is already here, and although SKIN DIVER may not have heard of it, some of us have already been fighting this bill for months . . .
GREGORY M. BAER SAN DIEGO, CA.

Because of printing, shipping and editorial procedures, SKIN DIVER must work with a 90-day lead time. Consequently, we work several months in advance.

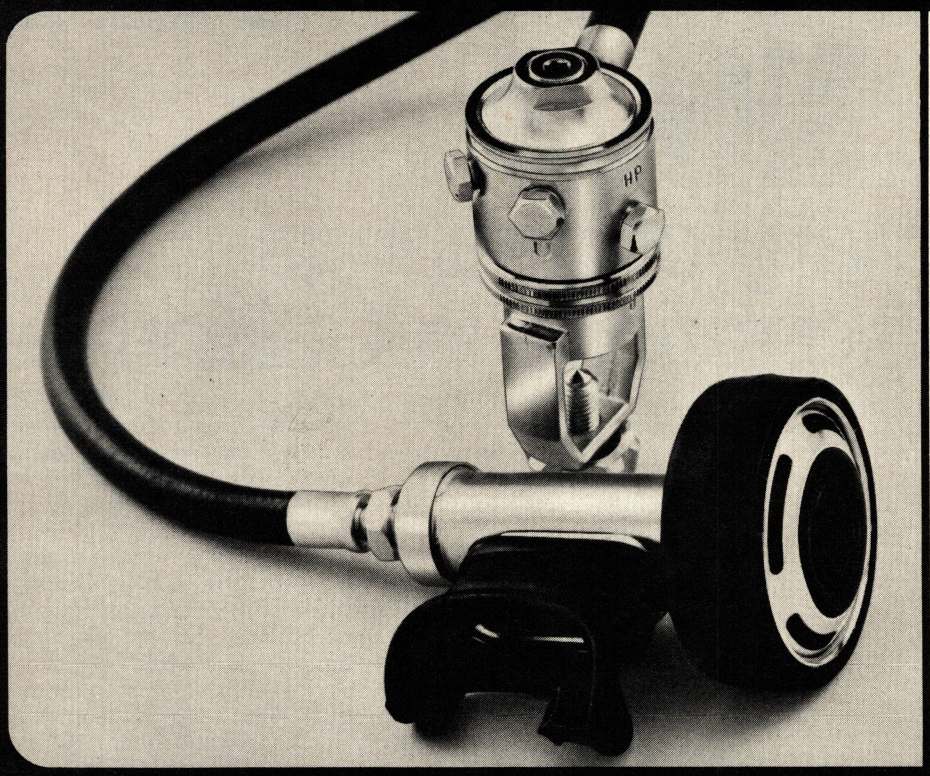
. . . Yesterday I read the late Jim Dugan's account of the Dumas-Malle dive on the *Andrea Doria* and I decided that today is, indeed, different. Diving equipment has advanced, diving knowledge has advanced, and man himself has advanced, but there are no journalists today that can capture the feeling of the sea and its explorers as did Dugan. I think his works should be read by the novice and not-so-novice diver for inspiration. He was truly a master and I thank SDM for printing his account.
MICHAEL FOLEY CHICAGO, ILL.

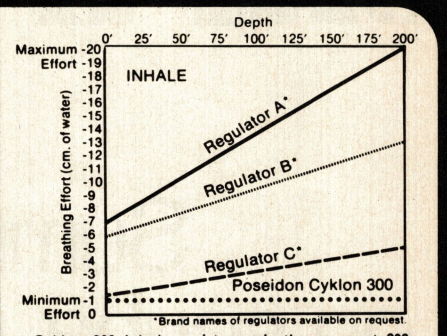
After having read the text of the Los Angeles dive law several times, I found myself reeling in disbelief! The law is one of the brashest infringements on personal freedom I have ever seen . . .

The law seems oppressive and for the most part unenforceable. As a resident of New York City, I am delighted that no such law exists here. I have compassion for my fellow divers in Los Angeles, and animosity towards the media and legislators that have made your pursuit of life, liberty, and happiness that much more difficult.
MARK SILVERSTEIN BROOKLYN, N.Y.

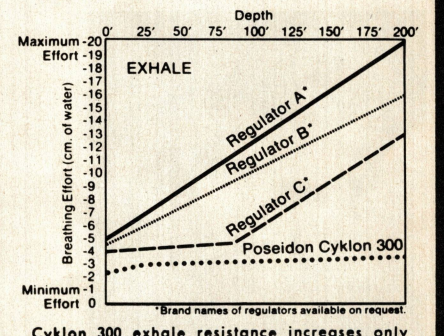
. . . I am very interested in borrowing good black and white or color photographs taken underwater of barracudas in various parts of the world, with the exclusion of the Western Atlantic Ocean. I am especially interested in obtaining good underwater photographs of large barracuda from the Eastern Tropical Pacific. These photographs will be used in connection with a study of these species throughout the world. Any assistance that SKIN DIVER readers can give me would be appreciated.
DONALD P. DE SYLVA
4600 RICKENBACKER
DIVISION OF BIOLOGY MIAMI, FLA.
UNIVERSITY OF MIAMI 33149

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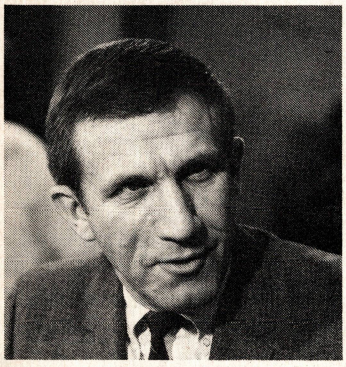


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NATIONAL SCUBA SAFETY REPORT NO. 3

Summary of hearings on scuba regulations in California



By Carl I. Sisskind,
Chairman,
Advisory Board on Underwater Parks and Reserves

Authorization — In a letter dated 26 November 1974, the Director of the California Department of Consumer Affairs asked the State Advisory Board on Underwater Parks and Reserves to undertake an investigation of the need for statewide legislation governing the sport of scuba diving. After conferring with members of the Advisory Board, Chairman Carl I. Sisskind responded in the affirmative and outlined to the Director the steps the Board proposed to take in conducting the investigation.

The Advisory Board was established in July 1968 under the aegis of the Department of Parks and Recreation and has been a functioning body ever since. Its membership covers a broad spectrum of interest, use and expertise in the field of underwater parks. Members are appointed by the Director of the Department of Parks and Recreation. The Board acts without compensation.

History —The present concern over regulation of scuba diving appears to have its genesis in a series of articles in the Los Angeles Times in August 1974, although this is not the first time such proposals have been made. The articles, not entirely devoid of emotionalism and some misstatement of fact, described the sport as dangerous and apparently rudderless in its leadership and training methods. The articles dwelled upon diver deaths and accidents and in the wake of these and related news stories and editorials, a number of letters and other communications were directed to the Governor and members of the legislature.

In October 1974, the Los Angeles County Board of Supervisors held discussions on the subject and ultimately approved an extensive ordinance regulating the sport in Los Angeles County. Subsequent to passage of the ordinance, and apparently as the result of second thoughts coupled with considerable criticism, the Board of Supervisors asked the Los Angeles County Underwater Safety Committee to undertake a review of the situation and recommend specific language to be incorporated into the already approved measure. A series of some half-dozen meetings were held, including contributions by a number of professionals involved with all aspects of scuba diving. The resulting recommendations were partially incorporated in the body of the measure although the ordinance itself continues to be the subject of considerable criticism.

Shortly after the Los Angeles County action, at least three other local governmental entities inaugurated studies. None of these has, as yet, resulted in formal legislation. However, the Governor's office, the Department of Consumer Affairs and various members of the legislature continue to receive considerable mail on the subject. One bill is pending in the legislature and it is the understanding of the Advisory Board that several others are presently under consideration.

Chronology of scuba diving and scuba instruction — Shortly following World War II, a wide interest in skin and scuba diving developed in the United States, largely encouraged by the Cousteau-Gagnan invention of the demand regulator. This made self-contained underwater breathing apparatus (scuba) available to the general public. In addition to the number of individuals who embraced the sport, small independent groups of divers sprang up in organized club form all over the country. They dove, traded information, pooled resources for equipment and shared a common enthusiasm. They represented people from all walks of life.

As the popularity of diving grew, the inherent risk to persons not previously acquainted with the use of scuba or the medical aspects of diving became more apparent. The need for training these people in order to enhance safety was recognized. The scope of diving had finally gone beyond the pioneering stage and was entering the level of a popular recreational activity.

The first formal training course in the United States took place at Scripps Institution of Oceanography in southern California in 1951-1952. In late 1953, some of these course graduates developed the first formal recreational diver training/instructor training program in the U.S., under the auspices of the Los Angeles County Parks and Recreation Department. Meanwhile, the YMCA had developed an interest in diving education and began diver training through its nationwide facilities.

In 1954, the Council for National Cooperation in Aquatics was encouraged by a group of YMCA, Red Cross and National

Academy of Science experts to take a look at the safety aspect of this engaging and rapidly growing activity. So the matter was placed on the agenda for a meeting at Yale University.

At the Yale meeting in 1954, an outline of material was assembled with a view to setting up a course sufficiently inclusive to produce capable performers. Over the winter (1954-55) in Washington, D.C.., under the direction of Bernard E. Empleton, a test course was run using this outline. A dozen local leaders were involved in the course and the Navy Experimental Diving Unit supplied leadership, along with the National Academy of Science, Southern Oxygen Company, the Red Cross, and a local university. The first course ran over 100 hours with heavy emphasis on medical aspects. The instructors were asked to reproduce the teaching material for possible development of a manual. This material was duplicated and reported back to the CNCA in 1955. An editorial committee (headed by Bernard E. Empleton of the Washington, D. C., YMCA) was formed with the following men: Dr. Edward H. Lanphier of the U.S. Navy EDU, Loyal Goff of the National Academy of Science, and Wallace Hagerhorst of the Washington, D. C., YMCA Aquatic Staff. James E. Young was later recruited to help out with the drawings. The material was compiled and edited, then published in 1957 by Associated Press under the title of *The Science of Skin and SCUBA Diving.*

In addition, in 1955, the first professional scuba divers (from the California Department of Fish and Game) were certified by Scripps Institution of Oceanography.

In 1959, the YMCA adopted its own program and certified its first instructors using the text developed by CNCA. A year later, a group of divers from Los Angeles formed the nucleus for the founding of the National Association of Underwater Instructors (NAUI). These were the first national training organizations.

The National Association of Skin Diving Schools (NASDS) was formed in 1964, combining training and retail equipment, so that divers buying equipment would have a place to get training in the use of that equipment.

The Professional Association of Diving Instructors (PADI) was formed in 1966 in the midwest and east coast where NAUI courses were not easily available. They instituted the first program for cross-certification of instructors previously trained by other national agencies.

For many years, the four educational programs thrived, each with its own techniques for the safe training of scuba divers. There were other local training organizations, but the national ones were and are more highly regarded. As each organization became an important member of the diving community, it joined in the Council for National Cooperation in Aquatics (CNCA). The need for cooperation in training was recognized, and the revision and establishment of national training standards was begun in 1968 under the auspices of CNCA. The ANSI Z 86 Committee standards were adopted by the American National Standards Institute (ANSI) in 1972. The four agencies have recently formed a subcommittee of CNCA entitled the National Scuba Training Council (NSTC), and are presently reviewing the 1972 ANSI standards of training.

Today, nearly two million persons have been certified as scuba divers in the United States (NAUI, NASDS, and University of Rhode Island reports). Most of them have been trained by one of the four instructional organizations previously mentioned. Of that number, fully 300,000 are Californians. In addition, the University of California maintains an active and highly regarded diver training program at each of its nine campuses, the preeminent program among them being that conducted at Scripps Institution of Oceanography. However, training within the University system is almost entirely geared to science and the need for underwater work in connection with a pursuit of given studies and/or research.

Diving activity and its impact on the economy and leisure life of California can be judged from a single statistic: among nine charter dive boats in the Los Angeles area in 1974, some 425,000 diver days were recorded. This does not include diving in that same area from private craft or by beach access.

Interest in the sport is measurably increasing. In the period 1970-74, nationwide, nearly one million divers were certified; that figure matches the total number of divers certified in the preceding 20 years.

California and Florida are regarded as the states with the highest diver populations followed, at some considerable reduction in number, by Hawaii, New York, and Washington.

Action by The Advisory Board — At the direction of the Chairman of the Advisory Board, a subcommittee was formed and three public hearings established. These hearings were held in San Diego at the Scripps Institution of Oceanography on Monday, February 10, 1975; at the State Building Auditorium in San Francisco on Friday, February 21, 1975; and in Los Angeles at the County Office Building on Tuesday, March 4, 1975. In each case, the Advisory Board member charged with the responsibility for the hearing made a considerable effort to provide the widest possible dissemination of hearing announcements. Some 500 news releases describing the individual hearings were either mailed or hand carried to the news media, dive organizations, dive shops, boat owners, members of the legislature, city and county officials, colleges and universities, and dive instruction organizations. These printed notices were supplemented by telephone calls and personal contacts. In addition, written communications were sought by way of the public media in the northern California coastal area where no public hearing was scheduled.

The results were significant. A total of more than 1100 people attended the three meetings; 250 in San Diego, more than 300 at San Francisco, and 550 at Los Angeles. Persons wishing to testify were asked to submit a written summary. In addition, those who preferred not to make a formal presentation were invited to submit a written statement.

At each of the meetings, news coverage was attained in newspapers, magazines, radio and television. In San Diego and Los Angeles, radio and television announcements were made prior to the meeting advising of the time and place.

Some 700 people signed petitions opposing any scuba legislation and presented them to the Board for the record.

While the majority of oral and/or written presentations came from individual scuba divers, representation was heard from dive shop owners, charter boat operators, instructional organizations (NAUI, PADI, YMCA, and NASDS), the Underwater Society of America, city and county officials, the State Department of Fish and Game, the Department of Parks and Recreation, the Los Angeles County District Attorney's Office and marine rescue organizations.

Diving equipment — There are approximately two dozen manufacturers of diving equipment located in California. Obviously, close ties exist between these manufacturers and the instructional organizations. This relationship has encouraged sensible and high quality standards within the industry. The manufacturers have responded positively to the increasing sophistication of both sport and commercial divers in terms of new kinds of equipment and continuous updating of the more standard gear. The Advisory Board found it interesting that none of the newer equipment has been developed through financial aid of government grant and that the U.S. Navy, for example, uses off-the-shelf equipment originally designed and manufactured for recreational diving.

Summary of hearings — The Advisory Board is convinced that the overwhelming majority of the diving community vigorously opposes any form of legislation pertaining to scuba diving. It would be impossible to draw any other conclusion from the formal oral presentations, written statements, or vocal comments from the audiences at all of the hearings.

The focal point of criticism was the Los Angeles County ordinance previously mentioned in this report. Despite repeated announcements to those appearing that the Advisory

(Continued on page 14)

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SAFETY REPORT

Board did not wish to debate the merits of that measure, its very existence seemed to demand some reference (invariably derogatory) by those testifying. The Advisory Board, therefore, feels compelled to discuss the ordinance in this report.

Testimony at the three public meetings indicated a nearly unanimous belief that the Los Angeles County ordinance was ill-conceived, ill-prepared, and difficult to enforce. Both the procedure for preparing the ordinance (consultation of experts or lack thereof; public hearings or lack thereof) as well as its provisions were severely criticized, with litigation over constitutionality, economic hardship, and loss of insurance coverage cited as direct results. AB 515 (1975, Warren and Cline) is a reiteration or an early draft of the Los Angeles County ordinance. Its authors and other legislators who have expressed interest in sponsoring a scuba bill have suspended their efforts pending evaluation of this report.

The Advisory Board finds a continuing sincere and energetic effort being made to upgrade the level of scuba diver instruction. To be sure, the current furor over the Los Angeles County ordinance and proposed state legislation spurred a burst of activity among instructional organizations, manufacturers and dive shop owners. The heightened pace is creditable, but it is not clear at this time whether it has added substantially to progress in achieving a higher quality in scuba diving standards and safety. The Advisory Board finds the revised standards of instruction to be well above the level we regard as basic to the safety of the student diver. The Advisory Board also found that these standards exceed the certification requirements set forth in the Los Angeles County ordinance and, in at least one case, those noted in pending legislation.

More importantly, available evidence indicates the compliance by instructors to be generally high. Close questioning following testimony by instructors showed that these standards are apparently imposed with a high degree of uniformity. In those cases where the Advisory Board found instruction was slipshod and of a nature which could have acted to the detriment of the student, actions had already been taken by one or more of the four instructional organizations to either censure or invalidate the certification of the instructors involved.

The Advisory Board also found a significant level of peer pressure among scuba divers. Recognition of inherent danger in the sport appears to have encouraged a remarkable degree of inter-diver support and assistance. This attitude, which extends to post-certification instruction and frequent

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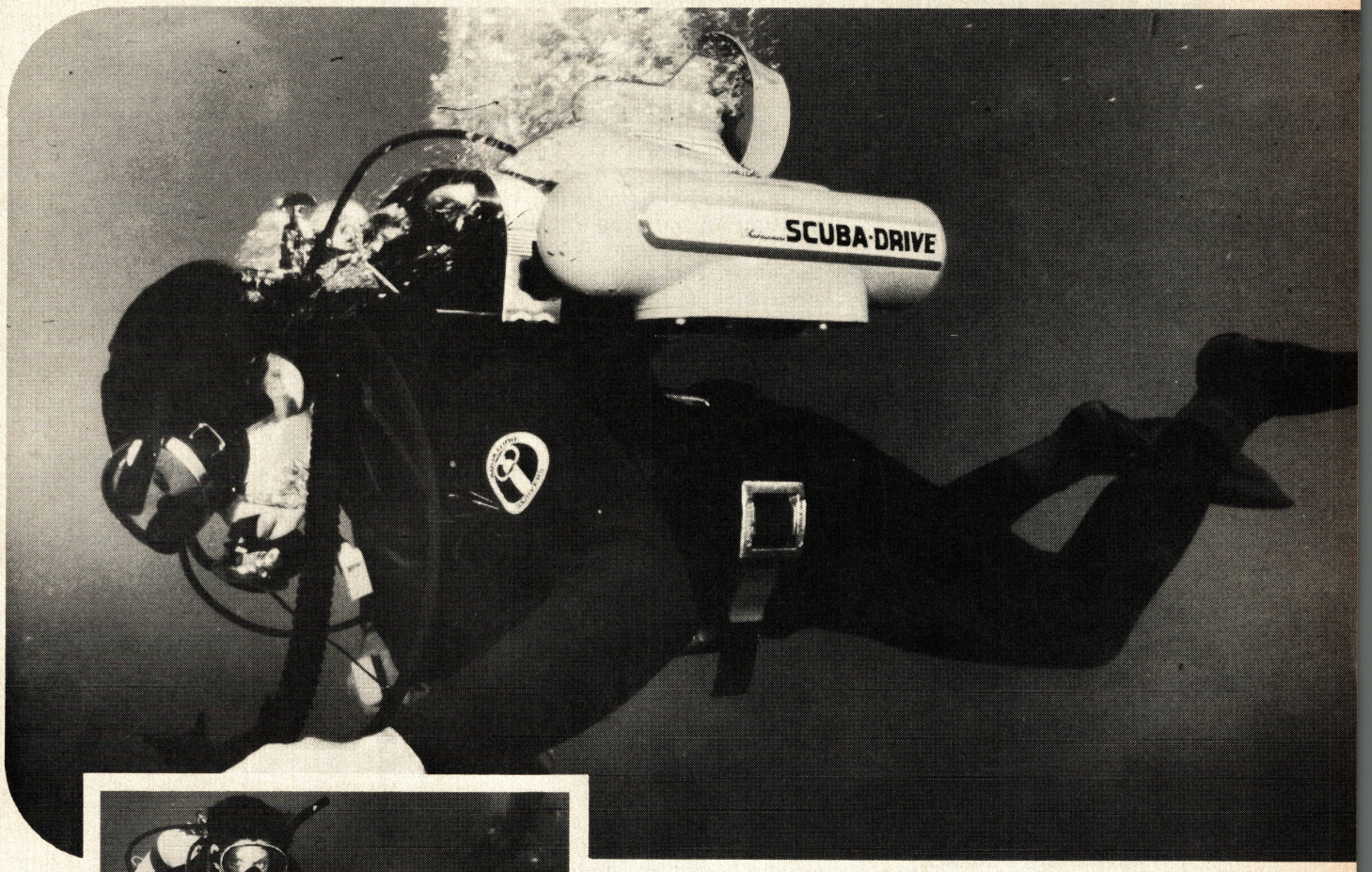
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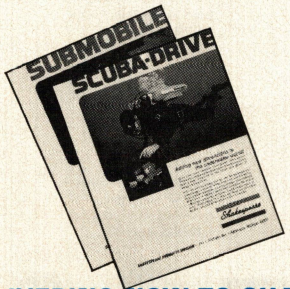
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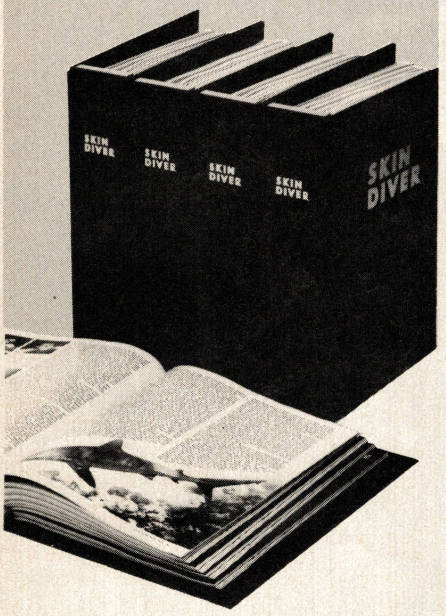
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SAFETY REPORT

classes on safety and methodology, seems best personified in the various organized dive clubs in California and other nationally recognized advanced diver programs. This peer pressure is further evidenced in the influence these clubs have, collectively and individually, on diving instructional organizations, dive shops and equipment manufacturers. As a result of presentations during the hearings, it became apparent that a close interrelationship exists on a continuing basis among these three groups. The Advisory Board recognized the self-serving aspect of such cooperation, particularly in the cases of the manufacturers, dive shop owners and instructor groups, but regards this as a practical and worthwhile end result.

The matter of enforcement was discussed extensively. Rarely was testimony received or evidence found that would support the viability of enforcement of legislation patterned after the Los Angeles County ordinance or any others of a similar nature being considered. Evidence offered by representatives from law enforcement agencies and volunteer rescue units uniformly condemned such legislation as being utterly counterproductive. The Advisory Board finds that enforcement of such legislation would be, in the opinion of those most concerned, a practical impossibility.

The Advisory Board could find no diver fatalities resulting from equipment failure. A determined effort was made both at the hearings and via individual research, but no such evidence was found to exist.

The Advisory Board could find no evidence of diver fatality resulting from so-called "bad air", although word-of-mouth reports were presented. The Advisory Board was generally impressed with the care applied by dispensers of air to the quality involved, although there is no evidence to show a uniform method of responsibility in that area.

Members of the Advisory Board vary in diving background. Some are instructors, some are responsible for major diving programs; all are experienced in sport, commercial, and scientific diving and therefore appreciate the dangers involved in the use of scuba. We found during the hearings an ascending order of concern as divers became more experienced. The Advisory Board found novice divers timid about the spectre of voracious sea animals, a concern more emotional than real, as opposed to the more practical concerns of depth-versus-time, physical condition and knowledge of the dive area among the more experienced. We feel such practical concerns can in no way be assured by legislation comparable to the Los Angeles County ordinance.

skin diver

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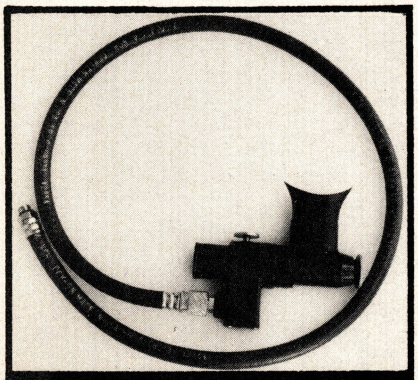
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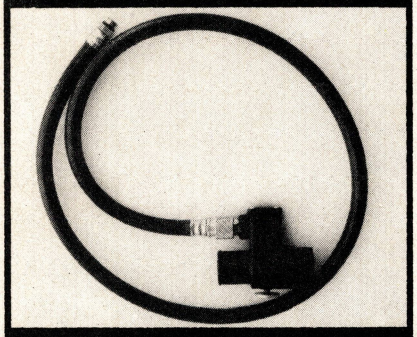
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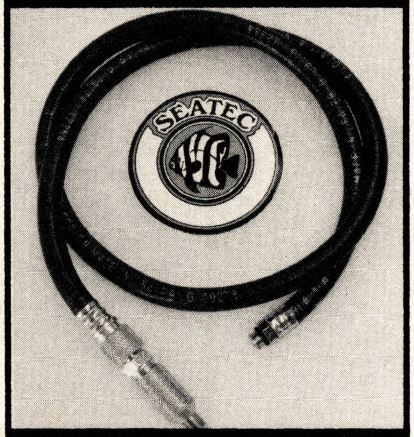
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The Advisory Board found an overwhelming belief that legislation would represent "another intrusion on me and my leisure time" by otherwise disinterested government. This concern was coupled with a belief that legislation would mean fees, fines and other expenses not presently invoked upon other individual sports activities. In short, divers feel they are being "picked on."

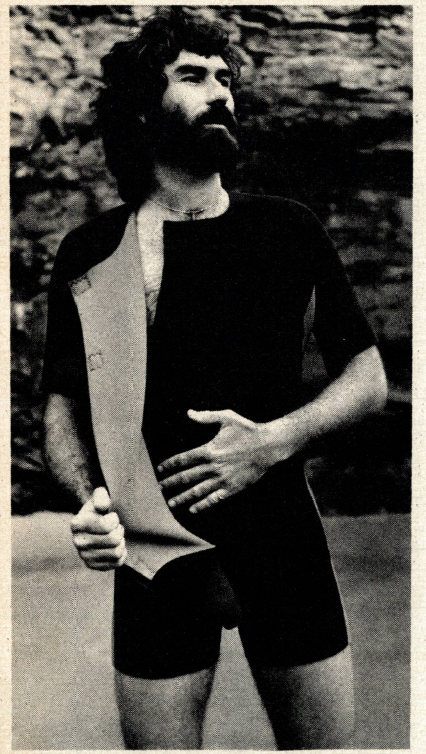
The Advisory Board took testimony from a representative of the Los Angeles County Parks and Recreation Department. Questioning and re-reading of the testimony fails to indicate a substantial demand for such legislation outside the confines of Los Angeles County government. Testimony from a representative of the Department of Fish and Game suggested that the state should pass some sort of diver regulation as a preemptive measure. By implication, the suggestion was that the single existing piece of legislation is inappropriate.

The Advisory Board received evidence to show that despite the substantial increase in scuba diving activity, the number of diver fatalities has not increased appreciably. In fact, it was shown that the number of diver deaths has remained about the same over the past four years in spite of a marked increase in the number of people certified to scuba dive.

Conclusions and recommendations: The Advisory Board believes the level of voluntary compliance among instructional organizations with respect to standards of safety and methodology to be such that legislative or formal regulation would serve no useful purpose. The Advisory Board further believes the four principal organizations involved (NAUI, PADI, NASDS and YMCA) to be actively engaged in a continuing program of instructor training that is reasonable and appropriate; that these agencies have reached the point of recognizing the necessity for self-policing and actively maintaining control over compliance to these standards by the instructors whom they certify.

The Advisory Board is convinced that legislative regulation of equipment manufacturers in this state is unnecessary at this time.

The Advisory Board recommends that the scuba diving industry (equipment manufacturers, dive shops, air stations, dive charter boats. etc.) require presentation of a recognized certification card before air for use in scuba is sold and prior to the sale or rental of scuba equipment. The Advisory Board further recommends that such document be authorized by one of the four previously described instructional organizations, the U.S. Navy or the University of



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An interview with:
Ed Brawley
President of Professional Diving Instructor College.

Parkway: Why did you start the Professional Diving Instructor College?

Brawley: It became apparent to me in 1969, after teaching and working in diving for many years, that none of the accepted training programs were producing professionals who could function in every facet of the diving industry.

Parkway: Are you implying that other courses don't do an adequate job of training divers?

Brawley: Not at all. They just don't go far enough to create truly professional full-time career instructors...and, I've never heard them claim to do so. That simply isn't their function.

Parkway: How is P.D.I.C. different from other certification courses?

Brawley: P.D.I.C. is an approved *vocational college* training for full-time careers. We also train professional educators to teach diving in schools, have a course for shop owners and managers, and open water courses for all instructors. We're concerned with education, not just diving ability.

Parkway: Do you supply equipment for your college students?

Brawley: Some. The students in the 12-week Professional Diving Instructor Course must supply their own masks, fins, snorkels, boots and gloves. We provide scuba, shark-skin two wet suits and all special equipment.

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Parkway: What are the requirements for enrollment at P.D.I.C.?

Brawley: Requirements differ for each course. However, all applicants must have a high school education or equivalent, basic diving ability, be at least 18, and pass the physical examination. There's one more requirement. Applicants should enjoy diving and want a stimulating, exciting and rewarding career!

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California and that the document make readily apparent the level of diver training, and that the diver's picture and signature, together with an instructor's counter-signature, be affixed to the card. We recommend that this practice be reviewed annually to determine the state of compliance and need for modification.

The Advisory Board recommends strongly that the State Health Department be instructed to develop appropriate standards of air quality and the means to enforce those standards wherever air is dispensed for scuba.

The Advisory Board recommends that all charter boats which serve as vessels for hire by scuba divers be required to provide the following: (1) An oxygen inhalator in good working condition with at least one on-board member of the crew trained in its use. (2) At least one on-board crew member trained and current in Cardio-Pulmonary Resuscitation methods as prescribed by the American Heart Association or the American Red Cross, and that this person be required to remain on board at all times that divers are in the water. (3) It shall be the responsibility of each vessel operator to compile an accurate list, before the vessel departs, of the names, addresses, and nature of certification of those aboard who will be diving. (4) That a functional first aid kit, including at least those materials necessary to treat minor diving-related accidents, be on board. At least one on-board crew member should be trained in basic first aid as prescribed by the American Red Cross.

The Advisory Board recommends that scuba divers be encouraged to undergo a physical examination by a physician acquainted with the special requirements involved in diving. The Advisory Board further recommends these examinations be once every three years for persons under 40 years of age and annually for those over that age actively engaged in the sport.

The Advisory Board recommends that scuba divers be encouraged to maintain a valid diving log reflecting each dive the individual makes, including date and time of dive, location, depth, name of partner (buddy), and time underwater. The Advisory Board further recommends that any scuba diver who does not make more than six dives in a given 12 month period be encouraged to undergo a re-certification examination by a qualified instructor to include at least one open water dive.

A need may arise for continuing advice to the State of California on matters relating to scuba diving. The Advisory Board stands ready to provide any such services. Recognizing that additional

expertise may be necessary should such a demand be made, we would expect to call upon recognized experts as matters dictate to sit with the Advisory Board in equal member status. Appropriate areas of inquiry would be to review current instructional status and methods within California, review circumstances and remedies (if possible) involving diver accidents and/or fatalities, recommend additions or deletions to existing diver regulations, review current equipment standards and suggest changes or modifications where necessary, review the enforcement and compliance with air quality standards and any other related matters which the appropriate authority may direct. A report would be prepared following each such meeting which report shall be available not more than 30 days following the meeting.

Summary — In all of the foregoing, the Advisory Board, in essence, has recommended that safety in diving remain primarily a matter of self-policing by divers and the diving industry. The extent to which this system is successful should be reviewed on an annual basis. In the event that evidence indicates the above recommended practices are not being followed, then statewide legislation to mandate compliance should be given serious consideration. However, in any consideration of possible regulatory legislation, the following criteria should receive primary consideration: 1. a demonstrable capability of improving diving safety, and 2. a practical method of enforcement.

SEASPACE '75

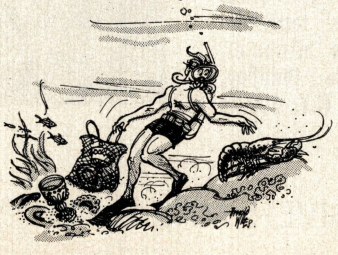
Sponsored by the Houston Underwater Club, Seaspace '75 and its photographic competition, the Seventh Annual International Underwater Photographic Competition, will be held in September of 1975.

The deadline for entries for the photo competition is August 18, 1975. For entry information, contact: Renzo Vaccari, P.O. Box 387, Spring, Texas 77373.

The film festival will be held on September 13, 1975, at Jones Hall for the Performing Arts in Houston, Texas. The matinee will be at 2:30 p.m.; and the evening show will be at 8:00 p.m.

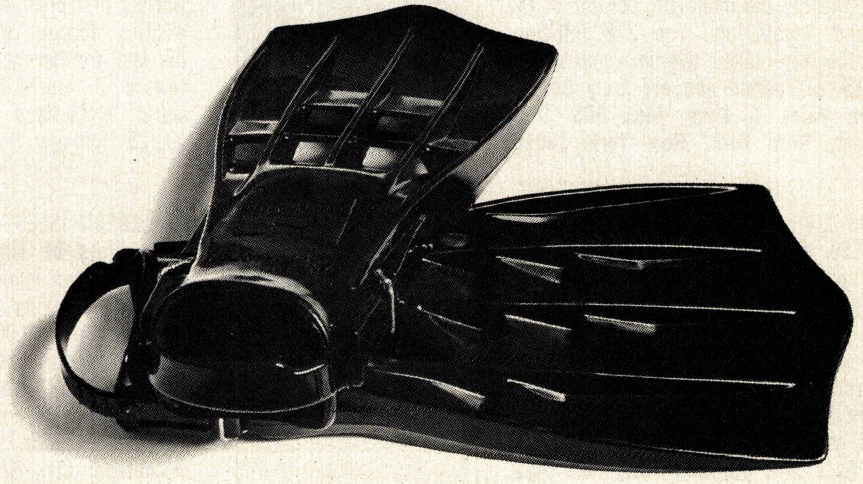
The symposium will be held September 13 and 14, 1975, in the Houston Room of the University Center Building at the University of Houston. Times will be from 9:00 a.m. to 5:00 p.m. each day.

For further information on Seaspace '75, contact: Bob Fowler, Kenlee's West, 5705 Glenmont, Houston, Texas 77036. Telephone: (713) 661-6080.

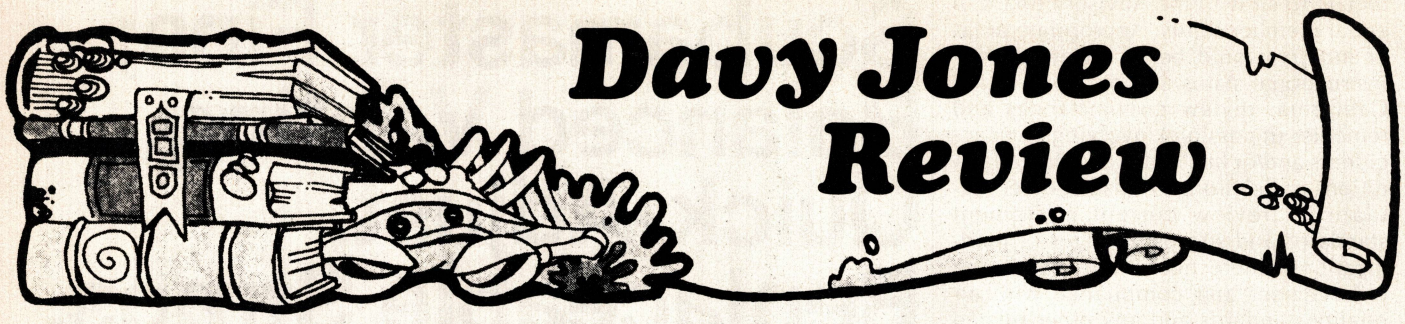


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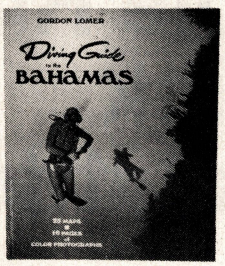
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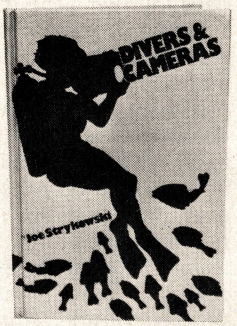
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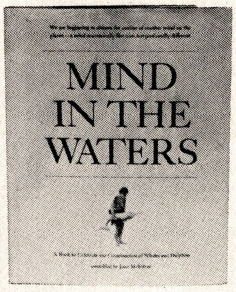
DIVING GUIDE TO THE BAHAMAS—by Gordon Lomer/$4.95. The clarity of waters and the diversity of diving sites make the Bahama Islands a must for traveling divers. This guide attempts to describe as many sites as possible including details such as depths, maps and what might be expected in each diving area. **Hastings House, 10 E. 40th street, New York, New York 10016.**



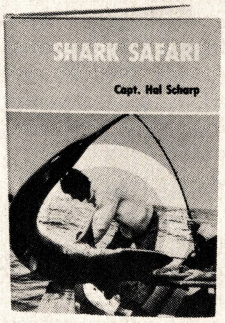
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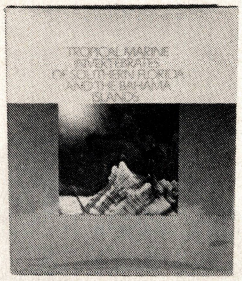
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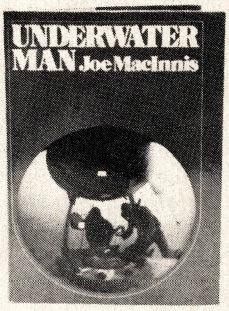
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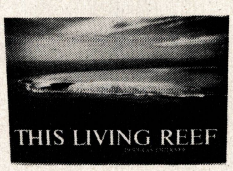
TROPICAL MARINE INVERTEBRATES OF SOUTHERN FLORIDA AND THE BAHAMA ISLANDS — by Warren Zeiller/$19.95 This excellent visual guide has been put together by the managing curator of the Miami Seaquarium. The 248 full-color photos were taken live in aquaria over a 15-year period and are truly unique. **John Wiley & Sons, Inc., 605 Third Street, New York, New York 10016.**



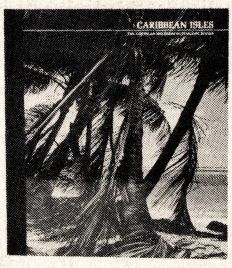
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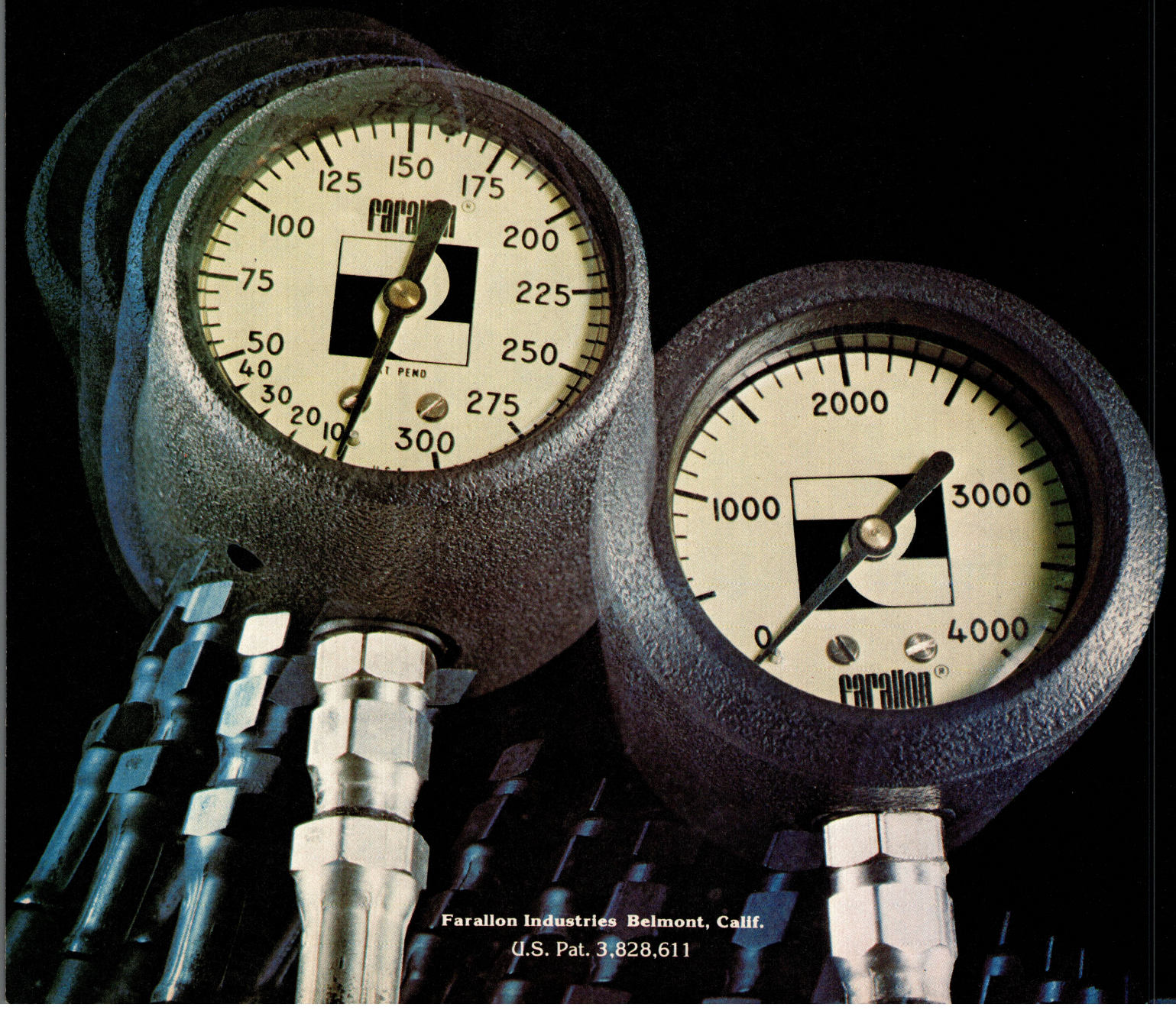
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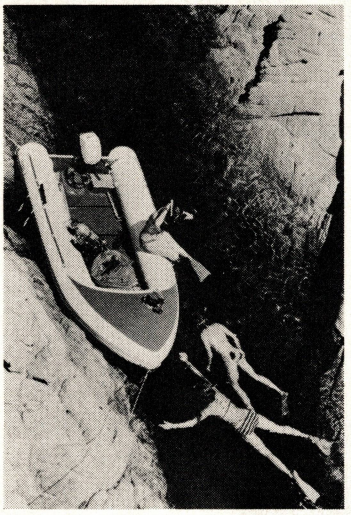
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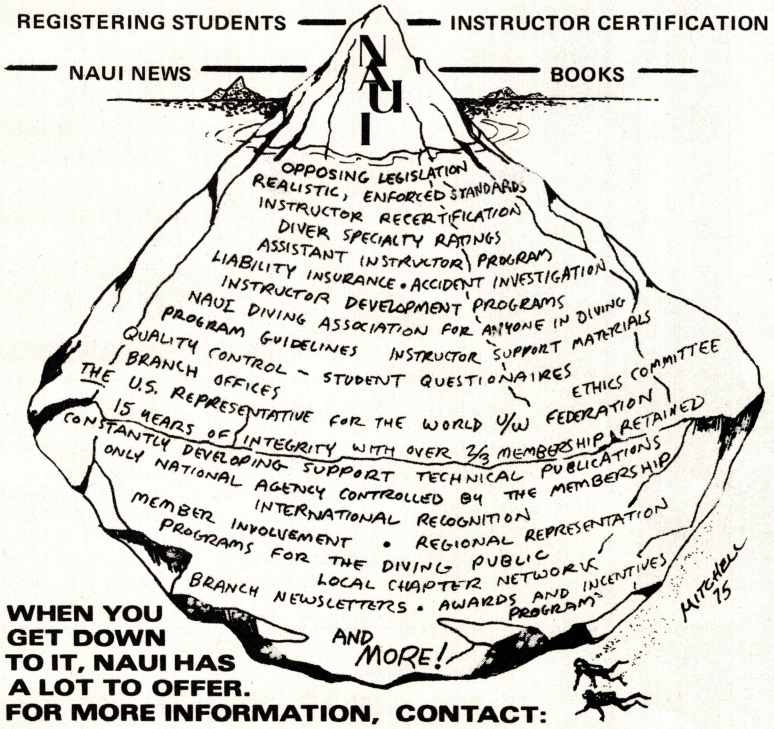
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Shell Facts

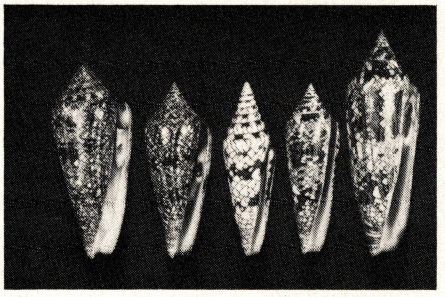
By E. R. Cross

Shellfacts is designed for the collector who wishes to improve not only the quantity of shells in his collection but also the quality of those shells. Toward this basic purpose the column will provide nontechnical but scientifically accurate information on all aspects of shells and shelling. Shellfacts is your column. Watch Shellfacts for information you can use.

The continuing response of shell collecting divers to Shellfacts has been very gratifying. For their questions or comments used in this month's Shellfacts, I would like to thank Mike Elias, Bakersfield, California; Robert P. L. Straughan, Belleview, Florida; and Louis T. Buono, Buffalo, N. Y. The above SDM readers will receive a shell from the collection of the author collected from Hawaii.

Wants I.D. of cone shell collected in Hawaii: — One reader wrote, "I have a textile cone (*Conus textile* Linnaeus, 1758) that I found while scuba diving in Hawaii. In the spring or summer of 1972, SKIN DIVER ran an article by Twila Bratcher. There was a shell in that article that looked exactly like the shell I found. I believe the shell is quite valuable, but I am not positive of this fact. Could you please tell me how I could have the shell appraised? Also, if the shell is valuable will it increase in value? If so, how much? Any information you could give me on this matter would be greatly appreciated."

I am not too sure the information I am about to give you will be appreciated, at least not greatly.



Left to right: two Conus gloriamaris; *one* C. milneedwardsi; *two* C. bengalensis.

The article you mentioned in SDM by Twila Bratcher was in the September, 1972 issue of the magazine. Several of the tent cones were illustrated in the article; *Conus dalli,* from tropical West America; *C. omaria,* from the Indo-Pacific; *C. textile,* Indo-Pacific; one other unidentified tent cone; and *C.*

gloriamaris Chemnitz, 1777. It is this last cone shell that was mentioned in the article as being one of the rarest cones. It is also one of the more valuable shells in the world of shell collecting. And it does resemble slightly the *C. textile* you found in Hawaii.

Shell price lists value *C. gloriamaris* at from $750.00 to well over one thousand dollars for a good specimen. *C. textile*, a shell that is found throughout the Indo-Pacific molluscan province, including Hawaii, lists at $1.00 to $2.50 for a good specimen. *C. gloriamaris* is collected (usually dredged) from deep water (200 to 1000 feet) in only a few areas: the Philippine Islands, Guadalcanal, and New Guinea, primarily. *C. textile* is collected quite frequently in Hawaii at scuba diving depths, usually in silt or sand under coral heads or rocks.

The rare *C. gloriamaris* differs from the much more commonly found *C. textile* by being more slender and longer, the shell is slightly lighter in structure, and has a slight "hour-glass" shape, while *C. textile* is slightly bulbous. Also the tent markings are somewhat different in the two shells. See accompanying illustrations.

Where can I collect shells in Hawaii? — A young Shellfacts reader stated in a recent letter, "I am going to Hawaii next summer and I would like to find some nice shells. How do you mainly find cowries in Hawaii? Under rocks or in trails in the sand? I only snorkel to a depth of about ten feet so tell me about shell collecting to that depth."

Hawaii is a big place. I am assuming the reader means the Honolulu area when he says Hawaii. Since the city and county of Honolulu encompasses the entire island of Oahu, brief mention of collecting areas on Oahu to a ten foot depth will be made.

Unfortunately Hawaii does not have a great abundance of shells. However, a wide variety of different shells can usually be found.

Near Waikiki, in fact an extension of the Waikiki area, is Ala Moana park. Off this park is an extensive reef system that produces a few shells to an early bird collector, particularly at low tide. Although a snorkeler who can get to a depth of ten feet should be able to find some shells at any stage of the tide, provided the water is clear, which it is about half the time. Over a period of years most cowries collected in Hawaiian waters have been found on Ala Moana Reef. But some of them very rarely and all of them not all the time. Also the drupe shells, cones, terebra, and miter shells are found, but again, not plentifully.

A few miles east of Waikiki is an underwater park area called Hanauma Bay. Here you can look but not touch. It is a well protected spot and most of the area has ten feet of water or less but is deeper toward the entrance to the bay. Fish are abundant and shells can be observed but not collected. Any snorkeler would enjoy this beautiful place, even though collecting is strictly taboo.

Almost any of the beaches along the north shore of the island are apt to produce beach specimens of shells, many of them in excellent condition and sometimes alive. However, snorkeling is sometimes difficult due to heavy surf. After large storm waves have washed up on the beaches is a good time to collect there. But be careful and alert for large waves. They can be dangerous.

If you are in the military or can get a pass to go to Hickham Air Force Base, there is a reef area there called Kam Reef (the reef is just off Fort Kamehameha at the entrance to Pearl Harbor) on which snorkelers occasionally find good shells, mostly cowries or cones.

Cowries are almost never found in the sand. A few cone shells, the miters, the terebras, and a few others live buried in the sand and leave sand trails when they crawl about. Cowries are found mostly in coral or, more likely, under coral or rock slabs. Most of the time they will be attached to the underside of the object. Turn those rocks and coral heads back like you found them.

Wherever you collect, whenever you collect — remember the shellers code: Take only the shells you need or will use at the present time. Leave the collecting area like you found it with all coral, stones, etc., turned back the way they were originally. Collecting shells is for

(Continued on Page 32)

AquaBug

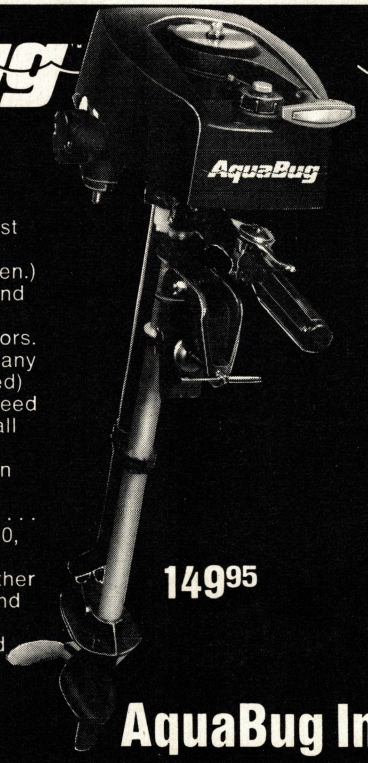
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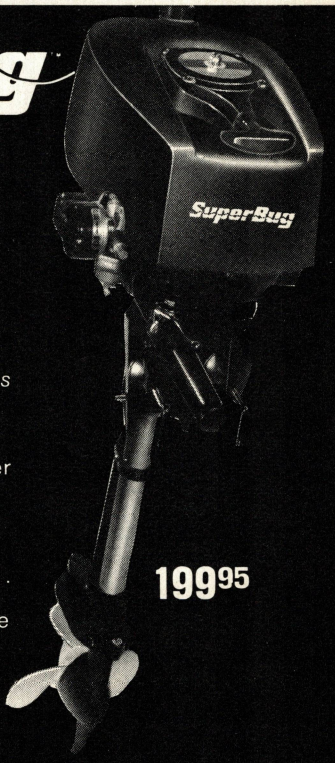
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Oce

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THE COLORFUL SOFTIES

By Carl Roessler



One of the loveliest and most delicate families of sea creatures are the soft corals, or alcyonaceans. These bushy colonies of tiny animals occur in a variety of shapes and a rainbow of brilliant colors. For a diver making his first foray into tropical Indo-Pacific or Red Sea waters, the exquisite soft corals are likely to be one of the exciting highlights of every dive.

The soft corals are members of the class anthozoa and the subclass alcyonaria, which includes gorgonia (sea fans and sea whips), organ pipe corals and sea pens.

All anthozoans are divided into two types; the alcyonarians or octocorallians, including soft corals, possess a body plan based on eight symmetrical parts in a ring. Other corals are members of the zoantharians or hexacorallians, whose bodies are based on a plan of six or a multiple of six parts.

Probably because of our knowledge of terrestrial plants and bushes, the hardest thing for human observers to accept is that each of these magnificent plant-like individuals are in fact an entire community. The bush or skeleton functions as a framework to hold hundreds or even thousands of tiny members up into the food-bearing ocean currents.

The tiny polyps of soft corals have a distinctively identifiable body structure. The body is cylindrical, with its base firmly attached to the colonial skeleton. The free end of each polyp is flattened with a slit-like mouth and a fringe of eight intricate movable tentacles. Tiny hairs or cilia move minute particles of food plucked from the water to the central mouth, where miniscule flagellated grooves beat a constant microcurrent into the hungry gullet.

Interestingly, some species of alcyonarians have two distinctively different types of polyps. The ones I've already described are clearly feeding polyps. The second type do not have the characteristic ring of tentacles, and are probably concerned with the circulation of water into and out of the main colonial body.

The main body (really more like a bag or bladder) manages to retain its shape by a loose scattering of limestone spicules or needles imbedded in its fleshy folds.

The soft corals which occur in quite shallow water (ten to 30 feet) tend to be rather floppy or leafy, and have low profiles, probably as protection against surf or wave damage. Their colors range from canary yellow to bright green to mud brown.

photography by Author

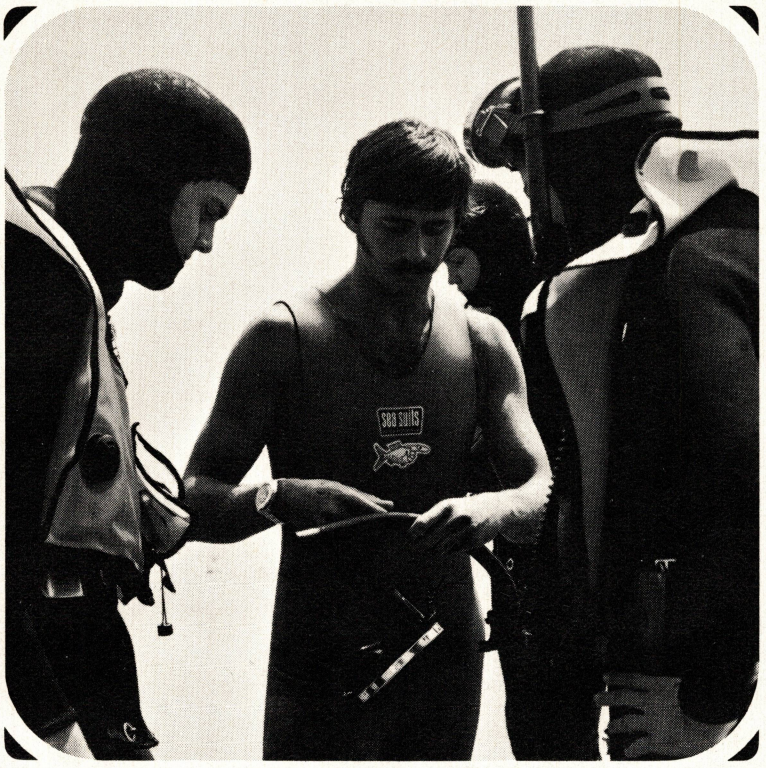


The brilliantly colored but structurally delicate varieties tend to be found in water at least 40 feet deep, and range to considerably greater depths.

These colonies are the wonders which attract serious underwater photographers like living magnets. New Caledonia, the New Hebrides, the Coral Sea, Micronesia, the Indian Ocean and the Red Sea are aflame with intensely hued varieties of these compelling creatures. From my own experience, soft corals rank with clownfish, sharks, chickenfish and sunken ships as the most fanatically magnetic subjects of the sea. No matter how many hundreds of pictures I've taken of these subjects, I find myself helplessly shooting more at any opportunity. This may of course be merely a sign of my own weakness or lack of self-control, but I'd really rather blame it on beauty, color, and the intricate form of these delightful colonial animals.



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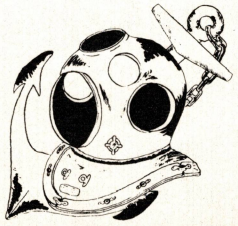
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Shell Facts

(Continued from Page 28)

fun and there can be no excuse for greedy, sloppy collecting that is harmful to the environment.

What are these shells up to? — SKIN DIVER publisher Paul Tzimoulis recently wrote, "Enclosed is a recent color photo which I took while diving off Roatan Island, Honduras, Central America. The two flamingo tongue cowries (*Cyphoma gibbosum* Linne, 1798) are pictured just as I found them. Are these shells copulating? If not, why are they together . . . ?



First, a little about this shell and then about what they might be doing.

The flamingo tongue cowry is not a true cowry but belongs to an allied or cowry-like group of shells. Four of the five species of *Cyphoma* are found in waters off the Southeast United States, Eastern Central America, and the West Indies. The fifth species is found in Western Central America.

The shells are quite distinct in appearance and cannot be confused with any other genus. The generic name of these shells *(Cyphoma)* is derived from the Greek word meaning hump that describes the hump-like back of the shells, usually crossed by a medium to large obtuse ridge. There are at least five species of this genus: *C. gibbosum, C. intermedia, C. mcgintyi,* and *C. signata* in the Gulf of Mexico/Caribbean area and *C. emarginatum* in the West Central America.

All known species are carniverous and feed mostly on the gorgonias, sea whips, and sea fans. *C. gibbosum* uses the gorgonia as a host for its food. In the photo submitted the food of this shell appears abundant.

Now about what these shells are up to . . . The mollusk *C. gibbosum* is a gastropod (order Mesogastropoda) and some of these animals are known to preceed copulation by a period of courtship-like movements. This may be what the shells are up to.

Also *C. gibbosum,* being of the

(Continued on Page 36)



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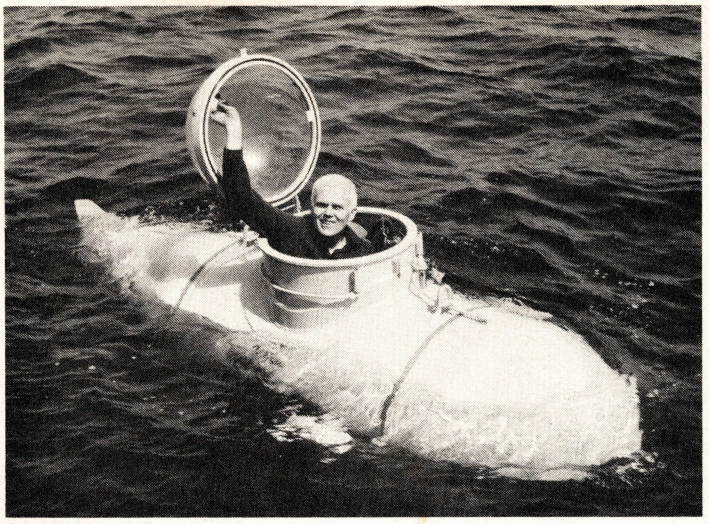
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photograph by Author

WHERE PRIDE RUNS DEEP

By Ellsworth Boyd

I pulled the hatch cover down gingerly, secured it with the latches on either side, then furtively glanced up at my instructor through the acrylic bubble that now sealed me snugly into the K-250 one-man submarine. Damn, I didn't even feel a little bit like Humphrey Bogart, Curt Jurgens, William Holden, or Rock Hudson, all sub captains in their right, who once barked orders to up periscope, man the torpedo tubes, full speed ahead! What's more, I didn't feel like singing the once popular Beatles hit, *Yellow Submarine*!

I felt like popping the latches, throwing open the hatch and getting the hell out of there! I don't like elevators, caves, cupboards or cubicles, much less a submarine built for one! After six verbal runs I was ready for the real McCoy, but not without taking hand-written instructions down with me! Poor Captain Kittredge — I know he must have been shaking his head when the water totally engulfed me, and the small, yellow sub settled on the bottom of the training tank.

Trying to comfort me, his last remarks were, "Even kids, fools and slow learners can operate this vehicle — it's so simple!" Well, I'm not a kid, therefore I was prepared to blend all the foibles of the latter two and become the first person ever to be rescued from the training tank! But hallelujah! Will wonders never cease? Twisting the two valves the Captain had designated during the dry run, without reference to my hand-written instructions, I bobbed to the surface like a cork. It was simple, so simple that I tried it three more times. And if I can do it, believe me, anybody can.

Simplicity, quality and pride in structure and design characterize the man — Captain George W. Kittredge and his product — the K-250. This ingenius, compact vehicle became a reality because the Captain, after commanding three different U.S. Navy submarines, wanted to see what the bottom of the ocean was really like!

A graduate of the U.S. Naval Academy, promoted to Lt. Commander at age 26, Kittredge commanded the submarines *Grouper, Sterlet* and *Trout* and headed the fast-attack submarine Division 11. He made seven patrols during World War II, one of which subjected him to an 18 hour depth-charge assault by Japanese destroyers. This pounding was the result of a direct torpedo hit on the Japanese aircraft carrier *Umryu*, one of ten ships in a task force that Captain Kittredge and his wolfpack attacked.

In 1946 he was appointed as Admiral Byrd's staff navigator for Operation High Jump, a 14 ship expedition that mapped the entire Antarctic coastline and sent planes into Byrd's camp at Little America. The Captain spent three years in the U.S. Embassy, New Delhi, India, and was later appointed Naval Attache in Tel-Aviv. He spent two years in the Middle East, then retired after 22 years of active duty.

Captain Kittredge was elected to the 102nd Maine Legislature, where he served two years. He ran for Congress, lost in the primary by less than 1,000 votes, then decided to devote his full time to submarines. Only this time he was determined to see the bottom!

"You know, in all those years I spent in submarines," he recounted, "not once did I view the bottom of the sea! I've always had an insatiable curiosity to observe and explore it in my own underwater vehicle. So I started designing, computing and building a mock-up, one-man sub. Gradually I gathered the materials necessary for assembly."

Jokingly, he boasted, "You know, I have the largest privately owned submarine fleet in the world!" He was referring to several K-250 vehicles that are complete, fully tested and for sale. Several others are in various stages of production in his factory in Warren, Maine, 60 miles northeast of Portland. When it's in full swing, the factory employs six men, with the Captain helping and checking each precision step in the manufacturing and fitting process.

He's capable of doing it all himself, for instance, cutting the groove for the conning tower O ring and facing off the seat for the conning tower hatch, all done on the big lathe. He faces off the seat for the bottom viewing port, also on the big lathe. On the turret lathe he works on the shafts that go through the hull, providing watertight seals for them. He and his workers make most of the parts themselves — gaskets, snorkel valves, etc. They do the welds, cuts, and even pour and mold the lead for the ballast attached to the fixed keels. They manufacture everything but the elliptical steel ends of the pressure hull and the rolled cylinders that form the pressure hull.

Captain Kittredge is an engineering genius. He has combined an innate technical mind with four years of study at the Naval Academy, and practical experience commanding three Navy subs. The result is a well designed, rigidly built underwater vehicle whose inventor takes great pride in design and workmanship. Shipbuilders and engineers at Bath Industries, manufacturers of destroyers for the U.S. Navy, certify all the welds on Kittredge's submarines either by x-ray or magnaflux of each weld. General Dynamics Corporation conducted the original external hydrostatic pressure test on the hull. Designed for a maximum operating depth of 250 feet, the hull successfully withstood pressure equivalent to 800 feet. The American Bureau of Shipping, known for its rigid specifications, certified the sixth production submarine. The Captain personally tests all of his vehicles. After the test on the sixth submarine, the American Bureau of Shipping wrote, "We consider the vessel to be seaworthy and fit for intended service at a 250-foot operating depth and recommend that it be classed A-1 Manned Submersible."

Operationally, the midget sub is simple and safe, with a great degree of maneuverability. It is ten feet, six inches long, has a maximum beam of four feet, six inches and stands five feet high, on twin keels. There are 800 pounds of fixed lead

ballast on these keels, making it impossible for the sub to roll over. It weighs 2200 pounds, but is easy to transport on a tandem axle trailer. Battery operated, it houses four 120 amp, 12 volt, standard automobile-type batteries beneath the seat. The K-250 will operate 16 hours on the same battery charge. The batteries are easy to service. They can be re-charged with a standard auto battery charger. Maximum speed, surfaced or submerged, is two and a half knots, with propulsion provided by two external motors, one on either side of the sub. They are capable of being rotated through 360 degrees, thus providing maximum maneuverability. The propellors are plastic, eliminating any possibility of corrosion. A bar, controlled by the feet — just like in an airplane, operates the rudder.

Are you wondering what kind of air the operator breathes? I was, especially when I peeked inside and saw two scuba tanks secured behind the seat. You breathe just like you're doing now because you remain at atmospheric pressure at all times. There's no danger of the bends or air embolism. After about an hour the air begins to grow stale. Then it's necessary to surface, open the hatch, and ventilate the compartment. After a few moments you can submerge again. One of the scuba tanks provides the high pressure air necessary to blow the sub's ballast tanks. It's good for eight to ten dives before a refill. The other is an emergency tank, with regulator attached, that the operator could use if he wanted to ditch the submarine. Each tank takes 2200 psi. The vessel requires minimum maintenance, other than recharging the batteries and the scuba tanks.

The engineering and simplicity of construction and operation of the K-250 is amazing. It has three ballast tanks that you flood to submerge, then vent to return to the surface. The main ballast tanks are large, free flooding (open at the bottom) fiberglass envelopes at either end of the sub. The reason for having them free flooding is so they can be blown at any depth without putting any additional strain on the pressure hull. In blowing these tanks you literally squirt a bubble of high pressure air out either end of the submarine where it's captivated by the two fiberglass envelopes. These two large bubbles of air float you to the surface. The third tank is called the variable ballast tank because it is capable of varying or changing the amount of water or air in it. It's located inside the submarine. Normally, the function of this tank is to achieve neutral buoyancy. But it will also bring the submarine to the surface.

Learning the basics of these tanks enables the operator to understand how he can easily return to the surface. The main ballast tanks will bring him up or the variable tank could do it. In case of emergency you can pull a release lever and drop a 190-pound lead weight attached to the bottom of the K-250. When the weight drops, the sub bobs to the surface. All of the features of the K-250 bear out the Captain's pride in creation and performance.

I'm six feet, three inches tall and weigh 185 pounds and had no difficulty at all getting in or out of the K-250. Even seated inside, I didn't feel totally constrained because there's plenty of elbow and leg room. Gracefully gliding like a swan on a lake, I piloted the K-250 around Rockland Harbor. There's a little feeling of apprehension in the beginning, similar to one's very first scuba dive in open water. But just like scuba, it's new, strange and fascinating. Each time you do it you're more relaxed, until suddenly the operation is automatic and you're fully enjoying the underwater sights.

There's a feeling of openness underwater because of the way you sit up high, peering through the acrylic bubble hatch. There's a little distortion looking directly down at the bottom, but at a 15 to 20 degree angle you can see well. There's a great horizontal view through the bubble hatch and if you want to check the sea floor there's an immediate view through the bottom port. This port is excellent for search and recovery, wreck exploration or reef survey.

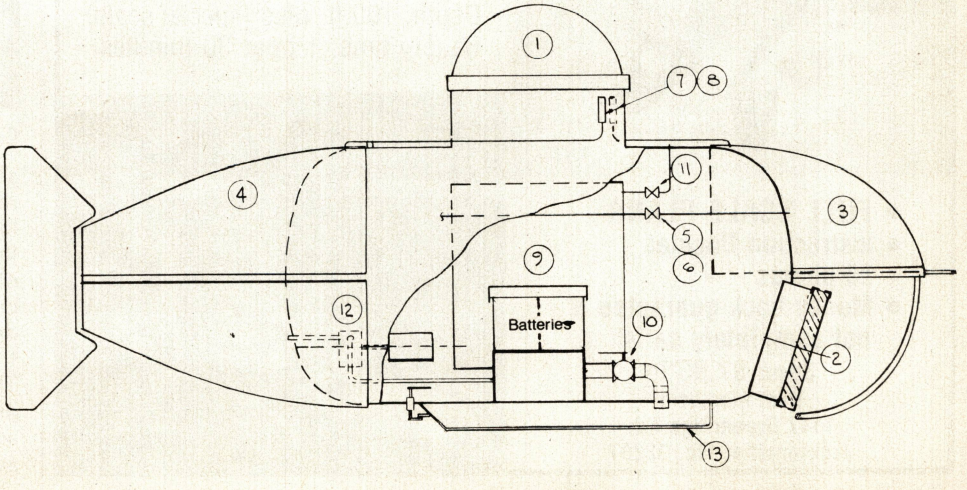
There's not much to see in Rockland Harbor — a few sand dollars, some scallops and lots of rocks and mud. But boy, I had some visions — like putting that sub right smack in the middle of a deep water Bahamian coral garden and gliding through stately canyons! To go down, you just push the motor handles forward. In planing down or up, these handles work very much like the joy stick of an airplane, only this is simpler than flying a light plane. Since the motors can be rotated 360 degrees, to go backwards you simply give the motor handles a half turn and you're in reverse. Peering through the acrylic hatch you can see the motors rotating as you turn the handles.

The K-250 is very seaworthy. It's no speed demon, but it gets you where you want to go. On the surface it's not affected very much by the wind, but strong currents can slow it down a little. Underwater, the currents have little affect on the vehicle. There's a snorkel directly in front of the operator, just above the depth gauge, that can be used on the surface in rough seas. You can breathe fresh air without opening the hatch.

The K-250 has outstanding potential for a variety of underwater uses. It's perfect for bottom inspection by marine biologists studying life in its natural habitat or mineralogists seeking clues to bedrock deposits. It's adaptable to shipwreck exploration, shellfish foraging, sewer line or piling inspection, research projects and simply as a pleasure vehicle. The Knox County Blue Fins, a local dive club that Captain Kittredge joined, uses it for search and recovery of anchors, lobster pots, etc. Being so simple to operate, the K-250 could become the first rental submarine for dive clubs or scuba resorts. Until the invention and manufacture of the K-250, high costs prohibited the average person from using a small submarine. This one retails for only $6000, with options such as underwater lights, a communication system, trailer and a mechanical claw. The Captain welcomes inquiries at: Kittredge Industries, Warren, Maine 04864.

Perhaps in our lifetime each of us finds one instant moment of joy. Having experienced it, we seek to kindle it again. Captain Kittredge found his moment of joy and kindled it with the K-250. Now he's working on a two-man submarine that will go to 1000 feet. But's that's another story, another day, another dive.

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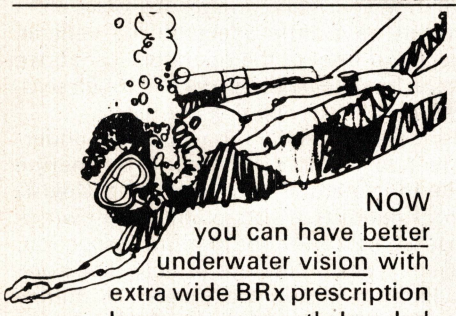


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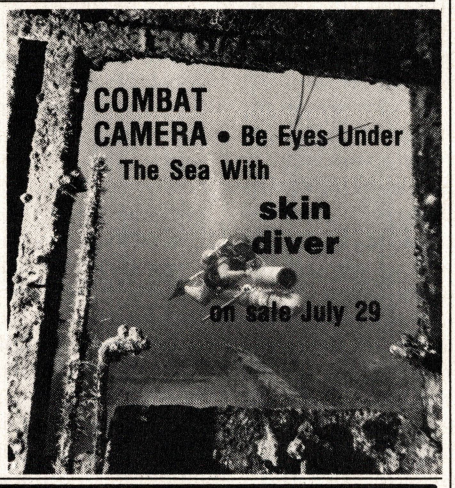
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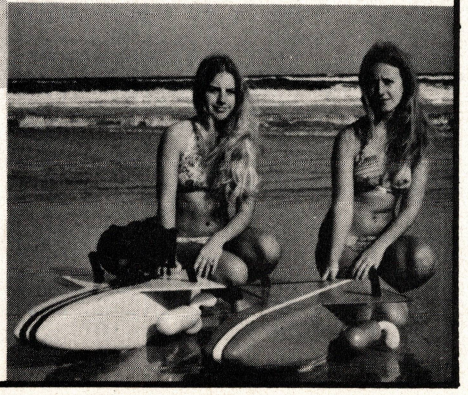




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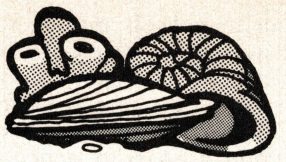
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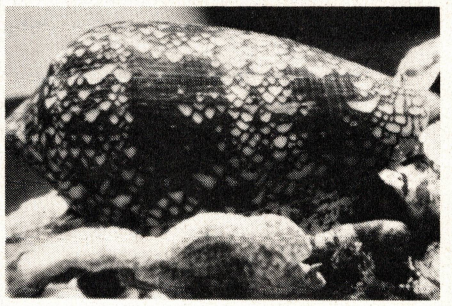
(Continued from Page 32)

Mesogastropoda, is hermaphroditic and has both a functional male an functional female organ. But the exchange of sperm cannot be reciprocal since the male and female apertures are widely separated. To achieve fertilization the shells orient themselves in the same direction then one settles down along the right side of the other shell so the male organ of the top shell can be introduced into the female organ to produce fertilization of the eggs. This may also be what the shells are up to.

Shells often crawl over each other in search of food or while feeding. It may be that the shells in the photo are simply two hungry animals after the same piece of gorgonia that lies directly in front of both shells.

For identification photos of the several *Cyphoma* species see the following books: *Sea Shells of the Texas Coast*, Jean Andrews, University of Texas Press, Austin; *Caribbean Sea Shells*, Warmke and Abbott, Livingston Publishing Co., Narbeth, Penn.; and *Sea Shells of Tropical West America*, A. Myra Keen, Stanford University Press, Stanford, Calif.

Reader emphasis collecting dead shell specimens: — A Florida reader who is also the author of several books dealing with marine collecting, aquariums, and marine life of the Florida reefs, wrote, "I think much greater emphasis should be placed upon the collecting of dead shells and that a dead shell in perfect condition



Conus textile *shown live in an aquarium.*

should be considered the prized find, rather than collecting a live shell and killing it. On a trip to British Honduras last year I was with several shellers. One of them found a stunning rooster-tail conch right out on the beach, already dead and cleaned. Another found a flame helmet in the same condition. There are many fine shells that can be picked up along the shore already killed and cleaned by mother nature without adding to the death of these marvelous

creatures. He went on to state, "Instead of collecting live shells and killing them, collectors should set up a small aquarium and keep the shells alive. With proper care most seashells live for years in an aquarium. The sheller will derive more enjoyment from his beautiful shells by observing them live in the aquarium. If they should die, he can still keep it."

I can't quite reconcile this reader's thinking. There is a difference between collecting a shell and placing it in an aquarium where it will eventually die or collecting the same shell and placing it in a freezer where it will die. I do agree that shells should not be collected just because they are there. If a collector has one or two good specimens of a species in his collection there is usually no reason for additional specimens. The exceptions are when a shell is needed for exchange. Then an additional specimen can be collected and sent to the individual as an exchange. Occasionally a collector may want to collect a group of the same species to study size, shape, or color variation within a species. A more conservation-minded method of doing the same thing would be to borrow specimens from other collectors to make the study. Museums borrow specimens from private collectors and other museums quite frequently.

There is also the fact that very few divers and collectors have the facilities or room to keep a marine aquarium.

Back to this reader's statement about a dead shell being just as good a specimen as a live collected shell . . . This is almost never true, even though color and condition of the shell may be in an apparent live condition. To be complete, a specimen shell must have the operculum with it, if the shell normally has an operculum. Invariably the operc is missing in a dead shell. Also, many shells have a periostracum. This too is lost when the shell dies, or at best soon after it dies. Finally, almost immediately after a shell dies in the water, marine growth and a thin calcareous deposit will cover the shell marring the true color or changing it slightly.

I do agree, dead shells can provide a source for many collector items. Sometimes dead shells washed up on the beach, or found in deeper water by divers, are the only source for specimens since, in some cases, no living shells of the species have been found. Certainly crabbed and dead shells should be collected to expand the collection. But not to the total exclusion of live shells.

Shells and aquariums: — One area in which the Florida reader and I agree on completely is on the total enjoyment and fascination of keeping shells in a salt water aquarium in the home or office. In fact, I first became seriously interested in truly studying shells as a result of watching them in a home aquarium. But whether you are a scientific collector, a hobbyist, a maker of shell jewelry, or

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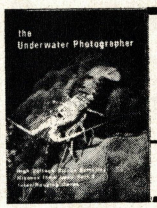
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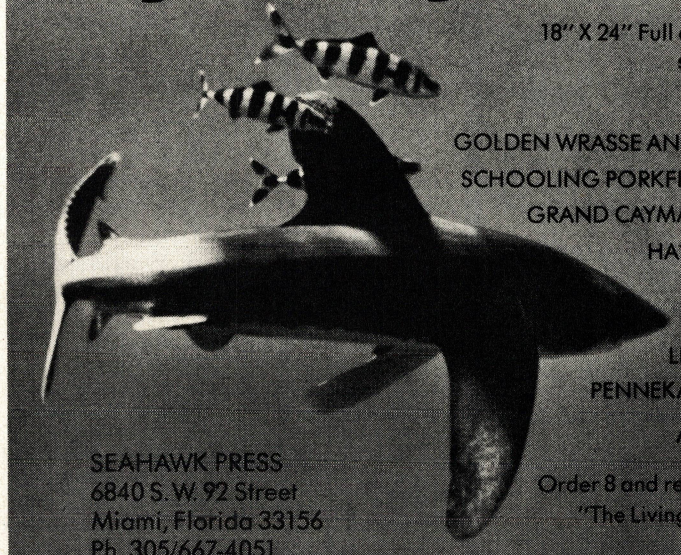
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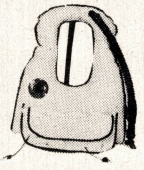
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Shell Facts

simply a beach stroller who picks up an occasional shell, the sheer beauty of live shells in a salt water aquarium will never cease to amaze. The word "shell" will soon leave your vocabulary and the word "mollusk", describing both the shell and the animal that makes and lives in the shell, will be used instead. Mollusks are very active, living animals. As the man implied, shells are the dead skeleton of the living mollusk.

Aquariums made specially for use with salt water are available in some shops. Usually such an aquarium will have the glass or plexiglass extending above the top of the metal frame so no metal can come in contact with the corrosive salt water. All glass panels making up the aquarium should fit snugly and be sealed with epoxy. The aquarium should be as large as possible, consistent with available space and facilities for handling water. A 15 to 18 gallon tank is usually considered minimum size for maintaining factors that keep the aquarium functioning properly. Smaller holding tanks, such as clear glass bowls, may be used for temporarily keeping different shells for study.

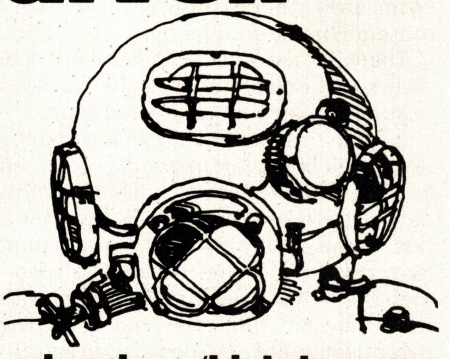
Water for saltwater aquarium: — Natural sea water may be used in a saltwater aquarium. But it must first be thoroughly filtered. If a marine aquarium or sea life park is near, filtered water can sometimes be obtained from them. If water for the aquarium must be taken directly from the sea, it is best to collect it from the base of a rocky cliff or near a rocky shore line rather than near or at a sandy beach. Never use harbor water.

If the sea water is suspected of having a high bacteria count or seems full of fine silty-appearing material, store the water in a dark closet for several weeks prior to use. Without light the bacteria will die and the cloudy material will settle to the bottom of the container. Then, without stirring up the water, run it through a filter into the aquarium. Water treated in this manner should not require changing for at least a year.

As water evaporates from the aquarium it is replaced with distilled or very pure fresh water. Since only the fresh water has evaporated do not add more salt water because the salt in the original salt water still remains. If only shells are kept in the salt water aquarium, PH and salinity of the water are not too critical. Temperature can also vary some without harm to almost all shells.

Salt water can also be made from distilled water by adding the artificial salts

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available from most aquarium dealers. These work as well as natural salt water. In fact, better than salt water when clean sea water cannot be obtained.

There will be more on aquariums in the next Shellfacts . . .

A good reference book on the subject is *The Salt Water Aquarium in the Home* by Robert P. L. Straughan, available from your local library or book store or from The Coral Reef Exhibits, Box 1000, Belleview, Florida 32620.

Remember, Shellfacts is your column. Questions, comments, requests for information, anything related to shells or shelling will be welcome from SDM readers. Send photos of your favorite shell; or ask for your favorite shell to be illustrated. If your question, comment, photo, or whatever, is used, you will receive a shell collected by the author from Hawaiian waters. Write to Shellfacts, % *SKIN DIVER* Magazine.

NAT'L SAFE BOATING

By Presidential proclamation, National Safe Boating Week is held annually during the week including the Fourth of July. The program, originated by the Coast Guard Auxiliary, serves to focus the attention of the boating and scuba diving public on the need to know and observe safe boating practices.

Our formal training for the underwater environment started in the classroom, pool, and finally the open water, guided by PADI, NAUI, NASDS, and YMCA instructors. To bypass this training would be foolish. On the other side of the coin, it makes sense that divers take a formal course in boating and seamanship.

The fact that a diver has gone through the expense and time to acquire a safe and informative knowledge of diving indicates that he is aware of the unfamiliar environment of the underwater world. The diver must not stop here, his next logical step is a boating and seamanship course and as with professional diving instructors, the best boating course is to take instructions from experts.

The U.S. Coast Guard Auxiliary is an organization available to the public with expert instructors. The Auxiliary has available to the diver free boating and seamanship courses.

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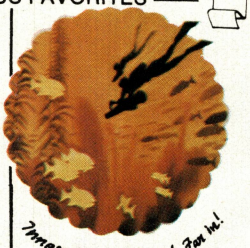
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September 13-14; 27-28; October 10-12
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MAN UNDER WATER 1975

The Fourth World Congress of Confederation Mondials des Activites Subaquatiques (CMAS) will be held at Eriks Fair, Stockholm, Sweden, on September 12 through 18, 1975, under the patronage of the King of Sweden. The Congress is organized by the Swedish Sport Diving Federation (SSDF) in conjunction with the Swedish Society of Mechanical Engineers, Naval Architects and Aeronautical Engineers (SMR) on behalf of CMAS.

The theme of the conference is "Man Under Water 1975" and one of the main objectives of the Congress is to present a broad documentation of what is going on or has just been accomplished in the fast developing underwater world in traditional as well as in new fields.

Qualified scientists, technicians and others working in a great variety of branches, but with man underwater as a common interest, will get an excellent opportunity to meet under the same roof and in a pleasant atmosphere. CMAS is the world federation of national bodies concerned with the safety and training of non-professional divers involved in sports, photography, science, conservation, medicine and the technology of diving equipment.

SSDF is the national body for Swedish non-professional diving. It has more than 7000 members and is growing fast.

For further information concerning the events, programs, write: The Fourth World Congress of Underwater Activities, % Stockholm Convention Bureau, Strandvagen 7c, S-114 56 Stockholm, Sweden.

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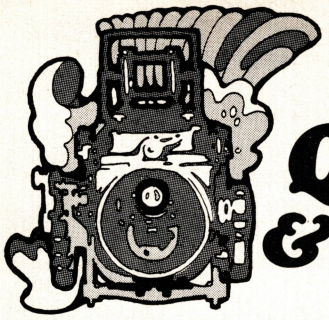
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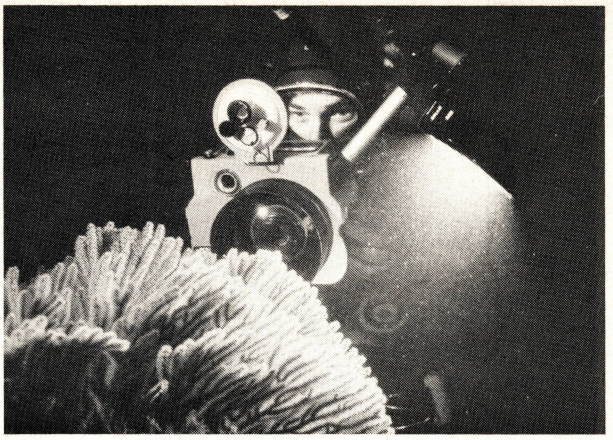


UNDERWATER PHOTOGRAPHY

Quick & Easy

PART LIV

TURBID WATER U/W PHOTOGRAPHY



By Jim and Cathy Church

The purpose of this article is to present some of the techniques of using close-up, normal and wide-angle lenses, with both available light and strobe, for turbid water U/W photography. Although this article was written for the still photographer, many of the techniques also apply to U/W movie making.

Getting close to the subject is the most common technique of turbid water U/W photography and is assumed throughout this article. As a rule of thumb, try to keep the camera-to-subject distance within one-fourth of visibility (the distance at which you can see details, especially in the shadow areas). If the subject has fine textures or details which are important to the picture, work within one-fifth of visibility. For silhouettes, of course, the distance can be increased as long as you still have an acceptable subject outline.

Close-ups — A Nikonos camera, extension tube and strobe unit form an excellent camera system for turbid water conditions. The visibility may be only a couple of feet, but the camera-to-subject distance of only a few inches will often guarantee good results. Aiming the camera is easy even in dim light — simply frame the subject with the focal frame. With a supplementary close-up lens placed in front of the standard Nikonos lens, you can photograph subjects at one or two feet when visibility may be only four or eight feet.

Housed cameras with reflex viewing systems are often used for close-up photography with close-up lenses, extension tubes or with special macro lenses. Because reflex viewing is often difficult in dim light, an U/W light may be needed to illuminate the subject while focusing. This focusing light can be hand held by another photographer, attached to the camera, attached to the strobe, or may be built into the strobe as with the Subsea Mark 225. Close-ups generally require strobe lighting which will be discussed later in the article.

Normal Lenses — The "normal" lens is that supplied as standard equipment for the camera. Usually these lenses have a relatively narrow picture angle underwater and will only focus down to about three feet. For this discussion, we will include both the Nikonos 35mm lens and the moderately wide-angle 28mm lens as normal lenses.

With available light it is often best to work with silhouettes, especially when visibility is less than four times your minimum focused distance. For silhouettes, follow three basic rules: get low, get close and shoot upward. Get lower than your subject to separate it from the bottom. Get close to maintain definition — often only your subject's head and shoulders will be in the picture. Coach models ahead of time to keep their hands and arms close to their bodies. If posing with a tool or camera, have the model hold the prop closer to his face than he normally would. This allows you to get more action into the picture with a minimum camera-to-subject distance. Be sure that the prop is held so it is also silhouetted and identifiable.

Shoot with an upward camera angle to outline the subject against the brighter surface above. Placing the sun behind your subject not only is an excellent technique for many pictures, but may also be the only way you will have enough light for an available light exposure in dirty water.

Wide-angle Lenses — The best method of photographing large subjects, such as entire divers or groups of divers, in turbid water is to use a wide-angle lens or a wide-angle adaptor with a normal lens (such as the "Green Things" Opal-Eye or Fish-Eye adaptors for the Nikonos). The basic techniques of getting low, getting close and shooting upward also apply to available light U/W photography with wide-angle lenses.

A wide-angle lens not only allows you to get closer to the subject, it changes the perspective of far and near objects as well. Close objects are emphasized and will appear larger than they really are in relation to far objects, and far objects appear to be smaller. This change in perspective is advantageous in turbid water — the emphasis on the near subject often gives the impression of clear water as the backgrounds appear to be distant. However, be sure that objects of like size are all about the same distance from the camera if you don't wish to change their relative image sizes on film. For example, should a model extend his arm toward your camera, his

The above picture shows the result of exposing for bright areas with strobes. Below, a bright, reflective subject was chosen and illuminated with strong side lighting to minimize illumination of suspended particles between camera and subject. Again they exposed for the bright subject area allowing the surrounding areas to go dark. Note the position of the strobe in both the pictures.





Upward silhouettes are a basic technique for available light in turbid water underwater photography. With available light it is often best to work with silhouettes, especially when visibility is less than four times minimum focused distance.

photography by Authors



hand could appear to be much larger than his head.

Wide-angle lenses also yield excellent depth of field even with the low-number f-stops and close focused distances often used in turbid water. This is because depth of field is determined by the size of the picture area as well as by aperture and focus. The wider the picture angle of the lens, the greater the depth of field at any given focus or aperture.

Strobe Techniques — Because a strobe illuminates suspended particles in the water as well as the subject, turbid water U/W photography with a strobe or flood light requires special techniques.

For close-ups, hold the strobe at an angle of 45 degrees or more to the subject so light reflecting back to the strobe from suspended particles will not be reflected directly toward the camera lens. Aim the strobe so that the beam of light cuts immediately in front of the subject to minimize the number of particles between camera and subject which will be illuminated. Because strong side lighting from the left may result in the right side of the subject being underexposed, we often use a small slave strobe (a Vivitar 102 in an Oceanic Products housing equipped with a Wein Micro Slave sensor) for fill light on the right side.

At medium distances with normal lenses, the same techniques of side lighting is basic, but subject selection becomes more important. If you wish details rather than silhouettes, select subjects which are lighter than their backgrounds. By exposing for a light subject the amount of strobe light needed is reduced; thus, there will be less light reflected from the suspended particles. If the subject is a diver, have him wear a brightly colored facemask, orange or yellow life vest and use either bright gloves or bare hands. If he is using a prop, choose something bright; a movie light used as a hand light is great. Expose for the light areas — the face, mask, vest and hands — let the black wet suit and distant background go dark. Should you expose for the darker areas, the bright areas such as shiny regulator parts, will be overexposed and surrounded by light glare as light reflecting from these parts strike the suspended particles around them.

If you prefer to work with silhouettes, the strobe can be placed behind the subject if you are not using upward camera angles toward the sun, or if the sun can't penetrate sufficiently to your depth. If the background is distant, aim the strobe toward the subject; if the background is close, the strobe can be aimed toward the background from the side or from behind the subject. Sometimes the strobe can be hidden behind kelp or rock formations for background or side lighting.

Wide-angle lenses often require strobes with beam angles of 90 degrees or more unless a narrow-beam strobe is used to accent a specific area of the subject, or a twin-strobe system is used to illuminate the entire picture area. We often use a Subsea Mark 50 to illuminate the subject from the left and a Mark 150 (in slave mode) from the right. For us, wide-angle strobe photography is often a two-person operation. One operates the camera and left strobe while the other handholds the Mark 150 in the desired position. Of course, two strobes are not required for successful pictures. A single wide-beam strobe can be used effectively for side lighting from above, below or from beside a subject, or for backlighting from behind. The technique of selecting and exposing for bright subjects also applies to wide-angle photography with a strobe unit.

Lastly, there is one more basic technique: minimize your body movements, especially with your fins — learn to settle in place without stirring the sediment on the bottom. In other words, don't be your own biggest problem in turbid water U/W photography.



The Fun World SEA

A weekend of play! . . . Our destination was Monterey. To most people this would mean visiting the quaint little shops along Cannery Row, eating at the exotic restaurants, and staying at one of the many hotels along the coast. For us the main attraction was the colony of sea otters to be found there.

The friendly sea otter is a soft, furry little sea mammal. He has whiskers, little pointed ears, warm piercing eyes, small front paws, webbed back feet, and a short flat tail. The adult sea otter weighs 40 to 100 pounds. He has a good disposition, always full of fun and is ready to play if approached correctly.

When we arrived at Monterey, we first had to find the exact location of the colony of otters. My diving buddies, Tim Baer and Scott Penwarden, and I had been told the area around Cannery Row was our best bet. We stopped at the Seven Seas Dive Shop to ask for information. They were very helpful and directed us to one of the larger colonies.

We drove down to the water, inflated our raft, loaded our cameras, put on our diving gear and were off for the large kelp bed just offshore. About a half-mile off the coast straight out from Cannery Row, we reached the kelp bed where 30 or more of our little friends were floating on their backs in the kelp sunning themselves. The kelp acts as an anchor for the otter while he sleeps. They often pull a strand or two over their body with their front paws, rolling in the kelp to anchor themselves.

We tied our raft to the kelp about 100 feet from the otters. Tim grabbed the goody bag which we had filled with squid from one of the local fish markets. Scott and I grabbed our cameras, and we slipped into the water. We started swimming slowly toward the sea otters.

Tim was in front with the food and would swim up to five or six feet from one of the little fellows and throw him a squid. Once the otter had tasted this delicious morsel, he would follow Tim, who would then swim back to us with the otter right behind.

Occasionally when Tim tried to open the goody bag, he had one of our furry friends trying to do the same and it was a struggle because the little guy was so persistent. It was a funny sight and one I wanted to capture on film.

of the California OTTER

The otter eats approximately 1/5 or more of its body weight daily. Since they have no body fat, the otters must eat this much every day. Only the large quantity of daily food and their very fine fur keeps them warm. They are greedy little fellows and would frequently tuck the first squid under their arm and come right back for another one. After they had received a second one they would surface, lay on their backs, and eat only the second squid, still saving the first one. Sometimes one would have three squid tucked under his arm. The otters have a pouch of skin under each foreleg which is used to hold food until it is eaten.

While we were feeding the otters they were very friendly. They would come up to us and sniff our masks. Their little whiskers tickled our faces. Once as I was heading back to the raft, one playfully kept grabbing my fins and climbing up my tank. Another time Scott and I were floating on the surface talking and two otters swam over, climbed on Scott's At-Pac and dunked him.

When we had emptied the goody bag we expected the otters to lose interest in us, but they stayed right with us. We continued photographing their antics.

It was interesting to watch them groom themselves. Their fur must be kept exceptionally clean to keep it from becoming wet, thus losing its warmth and floatation capability. The average otter has approximately eight hundred million individual hairs in its coat. The air in and around these fibers serves as an insulating blanket. This is why the otters are so meticulous in keeping themselves clean.

Just before we left, an amusing incident occurred. Tim had thrown an empty goody bag in the raft. We looked up to see one brave little otter climbing into the raft — bound and determined to get the goody bag which he was positive still contained more of the mouth watering squid. We rescued the goody bag a total of three times before he gave up.

Our friend, the sea otter, was in danger of becoming extinct at one time, but from what I observed, he is making a great comeback. I, for one, welcome his increasing numbers, both from a diver/photographer and human interest point of view. Their friendly and amusing antics provide many hours of comic relief in the world of survival.



The sea otter, once in danger of becoming extinct, is now making a comeback. A soft, furry little sea mammal, the adult sea otter may grow to weigh from 40 to 100 pounds. These otters became friendly with the divers and enjoyed their squid treats. Once the supply of squid was depleted, they didn't lose interest, but continued to provide the divers an afternoon of fun.



photography by Author



By Stan Keiser

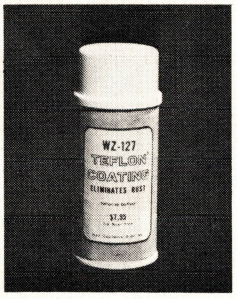


New Gear

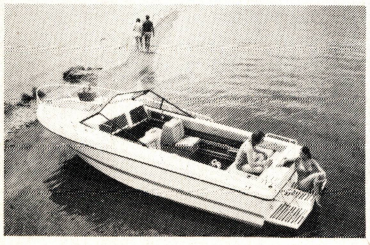
The new, compact STM-300 gives two hours of air regardless of depth. For working and serious sport divers, the STM combines technologies to provide a reliable semi-closed circuit system without electronics. The unit can be filled at any dive shop, serviced by owner, contains buoyancy and safety controls in a streamlined shell. 40 lbs. $1800. STM, Inc., Box 809, Cabo Rojo, Puerto Rico.



WZ-127 makes it possible for the average person to apply teflon coatings to any metal surface. This product contains billions of minute particles of DuPont Teflon which are deposited in the pores of the metal surface, provide dry lubrication, and are effective for continuous operation from −300°F. to +550°F. The price for the 6 oz. size aerosol can is $7.95. Bill Williams Company, Box 1037, Cleveland, Texas 77327.

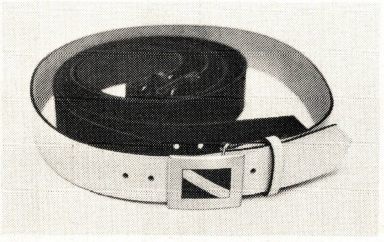


The new Commander Runabout from Larson at 21 feet has a BIA load capacity of 1875 pounds. It features a deep V hull, hidden side boarding step, stern boarding ladder, speedometer, stainless steel cruiser wheel, fully carpeted floor, teak bow hatch, much more. Options like the swim platform available. Contact: Larson Industries, Incorporated, 7400 Metro Blvd., Suite 460, Minneapolis, Minnesota 55435.



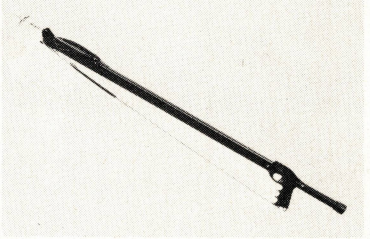


New from Seatec is their tire inflator assembly. Complete with 38-inch hose, this assembly also features a quick disconnect device. It is ideal for filling beach mats, tire tubes and other items with similar valve situations. Other accessories can fit on the quick disconnect hose such as the air gun attachment ($10.00), or the air nozzle attachment ($7.00). Price: $15.00. Seatec, 425 W. Palmyra St., Orange, Calif.

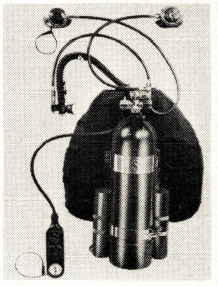


New from Dynamic Industries is this belt with gold buckle and inlaid divers flag. The 1 3/4″ clip-on leather belt is available in navy, black, brown, white, or tan. The sizes made are small, medium, large and extra large. The price for each complete belt is $9.98; the price for additional belts ordered is $5 extra. Write to: Dynamic Industries, 281-05 Grand Central Parkway, Queens Village, N. Y. 11427.

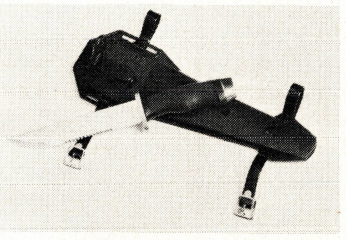
Aqua-Craft has re-designed its Manta speargun to improve its power and effectiveness. Three slots are now cut in its specially tempered 3/8″ stainless steel shaft so that three 1/2″ slings can power it. The 36″ barrel and 7″ butt extension are black, anodized to give the professional look. With a 42″ shaft, the overall length of the gun is 56″. $54. From: Aqua-Craft, 3280 Kurtz Street, San Diego, California 92110.



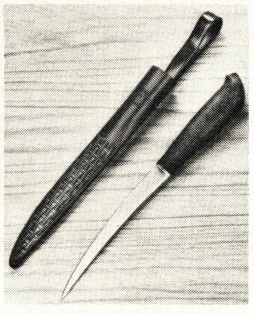
Scubapro has evolved diving systems, coordinated diving products to minimize personal effort and increase U/W efficiency. Shown: the Scubapro octopus system, instrument console, the automatic inflator, the depth computer/adjustable reserve, Mark VII, the independent weight system and left-handed octopus system. Prices, respectively: $70, $20, $35, $70, $160, $30, $80. From: Scubapro, 3105 East Harcourt, Compton, California 90221.



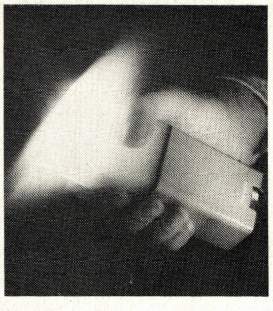
Healthways announces their new Seadiver knife and sheath. The stainless steel 6 3/4-inch blade has a serrated cutting edge and six inches etched in measuring scale. The knife comes with a slimline sheath and heavy gauge straps. The price is: $16.95. Contact: Healthways, 5340 West 102nd St., Los Angeles, California 90045.



New from U.S. Divers is a handy filet and skinning knife, specially designed for preparing seafood. Thin and sleek, it features an extremely sharp blade which is 6 1/8" long, corrosion-resistant, made of 440 stainless steel and comes with both a protective case and belt mounting. The introductory price is $4.95 plus 50¢ postage and handling. Order from: Richards Aqualung Center, Dept. SD, 233 W. 42 St., N.Y., NY.

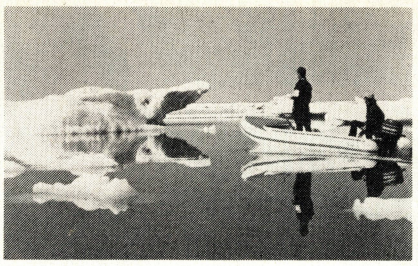


Honeywell's new all-purpose signal light flashes about once each second at a peak of one million candlepower. The light, encased in watertight plastic and designed to float upright in the water, is called the Honeywell Strobolite Electronic Flashing Signal Light. Housed in a 6-inch, impact resistant case, the Strobolite uses two C alkaline batteries and lists for $19.95. Honeywell Photo Products, 4800 E. Dry Creek Road, Denver, Colorado.

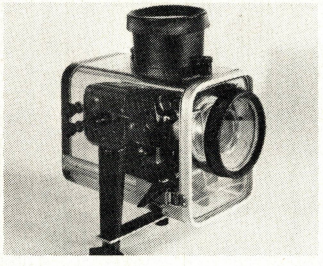


The latest in foot protection is the SunSock from O'Neill. This nylon one boot is ordered as an option to the SuperSuit. The SunSock is a 3/16" boot made to be worn with a durable nylon two seal boot as an overshoe to provide a dry foot covering that is long-lasting and warm. The price is: $24.95. From: O'Neill, Inc., 1071 41 Ave., Santa Cruz, Ca.

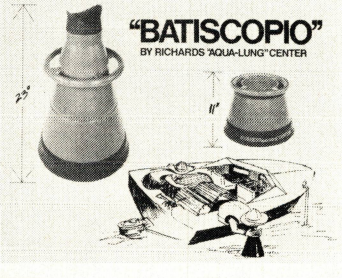




Bonair boats are constructed of a durable, nylon reinforced PVC-polymeric hull fabric. Shown, the Bonair III is 14'8" and rated for an 1130 pound load and a 40 hp motor. Deflated, the Bonair III can be carried in the trunk of a car, assembled in minutes. Only one of six models of inflatable boats offered by Bonair. $1125. Available from: Bonair Boats, Incorporated, 15501 West 109th St., Lenexa, Kansas 66219.



A new molded Lexan® housing for the Hasselblad EL electric drive camera is available from Ikelite. The compact housing is complete with controls for all camera functions, removable handle assembly, magnifying viewfinder, and provisions for the addition of optional flash and electronic flash. Optional fronts are available for 50mm to 135mm lenses. $295. Ikelite Underwater Systems, Box 88100, Indianapolis, Ind.

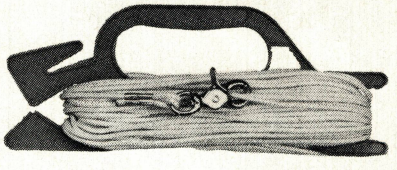


Richards Aqualung Center has made the Batiscopio available in the U.S. This portable U/W glass can enhance fishing, diving, and can work as a marine safety aid. Lightweight and easily portable, the Batiscopio consists of three sections and can be assembled from its 11", compact state to its 23" ready state in just a few minutes. Cost: $39.95, $1.50 postage and handling. Richards Aqualung Center, 233 W. 42 St., NY.

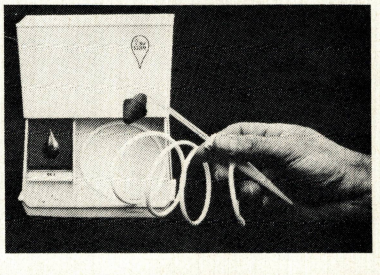
Let everyone know that you're a diver! Choose from any number of fun patches available from A-B Emblem Corporation to identify yourself as one of the "wet set." Or, better yet, send one to an enthusiastic fellow diver. Patches also made especially for organizations and clubs. Washable, easy iron on. Price: $1. A-B Emblem Corporation, Division of Conrad Ind., Box 40695, Weaverville, North Carolina 28787.



This new safety line and reel features a durable one-piece plastic reel; non-kinking 400 pound test, braided nylon line; spring-closing snap with thumb lever, and unwinding stop; a wedge lock, line snubber to lock the line at any depth you choose; and a built-in eye for attaching the reel to a belt snap. Reel w/o line, $3.00; with 100-ft. line, $9.75. Glenn Beall Ind., 1080 N. Ferndale St., Gurnee, Ill. 60031.



Hydro Med, Inc. has announced a new attachment for the Water Pik—the Grossan Nasal Irrigator Tip. The tip facilitates the use of the Water Pik to irrigate the nose and sinuses with a salt solution. The pulsating stream brings relief by a thorough removal of stagnant nasal material, good for postnasal drip or chronic sinusitis. $3.50. From: Hydro Med, World Way Postal Center, P.O. Box 91273, Los Angeles, Calif. 90009.

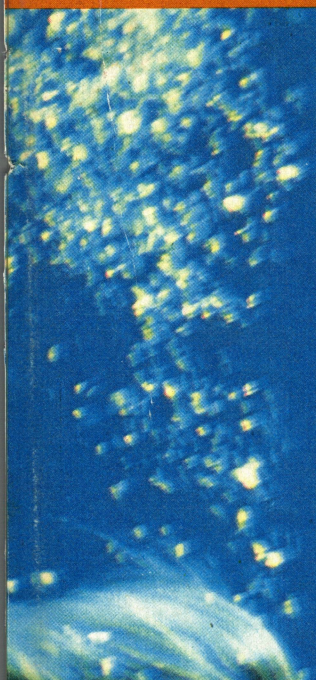


Dive Dacor



Dacor's dynamic approach to new product development starts with you—today's diver. Your demands for imagination in research and engineering as well as rigid quality manufacturing standards are reflected in every new item we introduce. For this reason, the professionals consistently depend on Dacor for innovations year after year. Make the professional's choice . . . see your Dacor Dealer today.

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[G] **DM-18 TENUE MASK.** Comfortable fitting double featheredge seal with minimum volume and maximum peripheral and downward vision.

[H] **OCT—OCTOPUS TANK DECAL.** Designed for instant recognition of octopus equipped diver. Adheres permanently to any tank surface.

[I] **DKT KNIFE-TOOL AND SHEATH.** New 420 series stainless steel blade with working tip, twin saw segments, line cutter and bottle opener, rubber sheath and rubber compensating straps. The working and wreck diver's knife.

[J] **400-2 OCTOPUS REGULATOR.** Ultimate in performance. Features anti-free flow system, balanced 1st stage, double filters, dual springs, and unique double exhaust. With 39″ yellow striped extra 2nd stage.

[K] **PBH DIVERS AND CAMERAS BOOK.** Unique new text simplifies theory, techniques and methods. For class or self teaching. Clearly removes the mystique surrounding underwater cameras, lenses, housings, filters, film, light meters, dome ports, macrophotography, strobes and flash. Hard cover.

[L] **TAG UNDERWATER AIR GAUGE.** Luminous full phosphorescent dual-scale dial, reserve zone, 360° swivel, rubber covered LEXAN case.

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News Briefs

By Hillary Hauser

BARING IT ALL

Stripper Fanne Fox, whose well-publicized relationship with Rep. Wilbur D. Mills (D.-Ark.) made headlines across the country, recently told news reporters of a new act she was planning. While holding her breath, Fanne plans to do a ten minute body-baring act underwater in a glass swimming pool. Says Fanne, who is 40, "Ten minutes would be just enough time to strip." Glub.

ASIAN ANCHORS

In 1971 a large stone achor was brought up in a dredge net from 600 feet of water off Cape Mendocino, Calif. The anchor was covered with manganese nodules. Scientists dated the nodules and found that the anchor was lost somewhere around 1500 B.C. After this discovery, other California divers found some "odd-looking" stones and went to California Wreck Diver Larry J. Pierson. Pierson went to the site and found what appeared to be three old Asian stone anchors. Pictures of the anchors, as well as rock samples, are now being studied by Dr. George Bass of the American Institute of Nautical Archaeology and the University of Pennsylvania Dept. of Asian Studies. Pierson is trying to obtain a grant to study and excavate the site.

WRECK SEARCH

A three-month search for 20 sunken vessels between Chesapeake Bay and the Florida Keys, and along Florida's Gulf Coast has been initiated. The 90-foot wire drag ships *Rude* and *Heck,* both NOAA ships, will chart wreckages that are navigational hazards.

SKI 'N' DIVE

A red flag with a diagonal white stripe is being used in Canada by water ski operators, and divers are concerned that the flag may be confused with the nationally recognized Divers Flag. The Association of Canadian U/W Councils is working toward a resolution of the problem, pointing to the chaos that could result with skiiers marking their courses with such flags. They feel that the average boater wouldn't know whether to launch a skier or look out for divers whenever such a flag appears on the horizon.

DAS MEER

"Das Meer," or the Celebration of the Ocean, was the theme of a two-month exposition which took place at the Kunsthalle Museum in Nuremberg, Germany. Austrian diving pioneer Hans Hass opened the exposition, which ran from Jan. 31 - March 31, 1975. Seven rooms of the museum were devoted to paintings of the sea, ocean architecture graphics, as well as audio-visual displays. Jurgen Claus, editor of *Submarin* magazine, published in Munich, reported that the exhibition was a "huge success."

ISRAELI PROGRAM

Four Israeli military divers have received financial backing from the Jewish community in the Los Angeles area to enroll in Commercial Diving Center's Bell/Saturation Course. The program was conceived by Leonard Greenstone and will prepare the four for employment in offshore oilfields.

CARTAGENA UPDATE

In March of '75 we reported on the Cartagena Project, stating that the discovery of the Spanish galleon *San Josef* near Cartagena resulted in a package deal between Seaborne Ventures and the Colombian government to excavate 71 wrecks that may amount to as much as $500 million. Our error: the contract is with Explorations Unlimited, Inc., and Seaborne is a sub-contractor under the Explorations permit. Additionally, authorities are investigating coins and artifacts to make positive identification of the wreck which is believed to be the *San Josef.* That makes things a bit less positive than we thought.

Meanwhile, Dr. Raymond F. McAllister, professor of Ocean Engineering at Florida Atlantic University, is presently participating in the Seaborne project in Cartagena. McAllister, who is listed in *Who's Who of Science* for his work in oceanography, will serve as oceanography and engineering consultant during Seaborne's five-year contract.

KEY VICTORY

The Florida Keys coral reef is expected to be nominated as a marine sanctuary by NOAA's office of Coastal Zone Management, but the action is not expected to go through before the end of this year. As proposed by the Florida Dept. of Natural Resources, the sanctuary will cover an area of approximately 100 square miles seaward of Key Largo and adjacent to Pennekamp Coral Reef State Park and Interior Department's Key Largo Coral Reef Preserve. According to *Ocean Science News,* if the sanctuary idea is approved, all activities would be prohibited except limited commercial fishing, skin diving and boating. Development activities along the Key Largo coast would be monitored. Before the sanctuary can be designated a public hearing will be held and an Environmental Impact Statement required.

JAWS FOR "JAWS" AUTHOR

In early winter of 1975 the viewers of the popular ABC-TV *American Sportsman* series were treated to a dramatic saga of white sharks. The star of the segment was Peter Benchley, author of the best-selling novel *Jaws,* about a great white that terrorizes an east coast resort town. In the film, Benchley, who had never seen a great white, gets his first look at one, underwater. The underwater segments were shot in the Coral Sea, at Marion Reef, and off southern Australia by veteran filmmaker Stan Waterman. The show pulled in the highest rating in the history of the series and will be aired again at a future date.



In the words of Waterman: "Here we are (Benchley, left), just before we braved the gnashing teeth of Whitey."

DIVING TESTS

In February of 1975, three divers stayed for four days under the Canadian ice in an U/W habitat — and it is believed to be the longest under-ice dive to date. The divers were Bob Wicklund and Dick Clarke of the *Hydrolab* U/W research program in the Bahamas, and Dr. Morgan Wells of the MUST office of NOAA. The divers studied the metabolism of benthic communities, the respiration function of fish, and the effects of cold water (28.7°F) on a diver. The habitat was *Lora I,* which was placed at 30 ft. in Conception Bay near St. Johns, Newfoundland. Excursion dives were made to points 120 feet from the habitat.

Previous to the *Lora* dives, Wicklund and Clarke had participated in excursion decompression dives from the *Hydrolab* habitat on Grand Bahama Island. The two spent seven days in *Hydrolab,* making excursions to study the vertical migration of fish, and testing excursion decompression tables that had been developed at Tarrytown Labs, New York. *Hydrolab* depth was 45 feet, and the divers made an excursion to 200 feet for 60 minutes. In the past, decompression tables for this sort of dive have been greatly limited for deeper depths.

SCIENTISTS BACK

That coelacanth expedition we told you about in February has returned, and the results of the mission are mixed. Steinhart scientists went to the Indian Ocean to catch a live coelacanth for study. A live one was not caught, but rare fishes were successfully brought in, some of them not yet named. Dr. John McCosker, director of Steinhart, also sent back for study two frozen coelacanths that had been previously caught. The prehistoric creature was thought to be extinct until 1938, when a Comoro Islander pulled one up.

JAPAN EXPO OPENS

Expo '75 opens this month on Okinawa. The ocean exposition will be held from July 20, 1975, to January 18, 1976, and will carry the theme "The Sea We Would Like to See." There will be five major areas spread over 250 acres. These include pavilions on fish; people and history; science and technology (which includes the U.S. pavilion); ships; and the Japanese government exhibit — a floating city called "Aquapolis" which is moored about 630 feet offshore. Aquapolis is a semi-submersible platform that can take 2400 visitors at a time in its exhibit halls, as well as 40 full time residents. The U.S. pavilion consists of eight 46-ft. diameter octagonal, canvas-topped modules on a hillside site. The overall theme of the U.S. exhibit is "Energy From the Sea," and will include such things as offshore drilling technology, weather, an U/W demonstration tank, a 3/4 scale model of *Alvin,* and man-in-sea. In all, 36 U.S. firms are participating in the exhibit. The Russians have some surprises in store, too, one of which is a floating platform that simulates the deck of a ship tossed by heavy waves. Visitors can stand on it (or try to stand on it) while watching a color film, *Poetry of the Ocean.*

JOT

Jane's Ocean Technology 1974-75 has been published by Janes USA (Franklin Watts, Inc., 730 Fifth Ave., N.Y., N.Y. 10019; $55; 344 pages.) The first year's book is similar in format to *Jane's Fighting Ships,* and has chapters on submersibles, U/W habitats, diving facilities, unmanned U/W vehicles and seabed vehicles.

CORAL & NARWHALS

Divers probing northern waters have found live coral growing in the Hudson Bay near Southampton Island. Coral that has been previously found in the area has been dead for some time (it is believed to have originated before the last Ice Age). According to Wayne Gzowski of Arctic Divers, his outfit spent a month in Strathcona Sound and Pond Inlet of Baffin Island taking movies of the narwhal (whale with tusks). When they dived in the Coral Harbour area of Southampton Island, they found five purple coral as well as huge concentrations of crabs and scallops. Gzowski feels that the area may support a viable fishing enterprise for natives.

FINAL SEA-LINK REPORT

In March, the final report came out on the *Sea-Link* tragedy of June 17, 1973. The report recommended: that the U.S. Navy and Coast Guard develop civilian submersible rescue operations; that the Coast Guard acquire an U/W television unit, deliverable by air and which is capable of providing a descending line to a submerged vessel; that the Coast Guard collect information on world-wide submersible search and rescue capabilities so that the most effective equipment for use in U/W emergencies can be made available; and that owners of the *Sea-Link* establish operational guidelines to prevent entanglement in the future. We got this information from *Ocean Science News,* which also stated that the sub was ruled vulnerable to entanglement, that the CO_2 absorbent system was found to be inadequate, that the lack of suitable rescue equipment nearby contributed to the deaths; also that there was no releasable distress buoy. The *Sea-Link* has reportedly incorporated a number of new safety features since the accident.

PLANE SEARCH

Englishman John Edwards is still looking for financial backing to prove his theory that bandleader Glenn Miller's plane crashed in the English Channel (NB, Dec. '74). Edwards is trying to raise 15,000 pounds ($36,000) to lift an aircraft wreck he has found in the channel 12 1/2 miles southwest of the coastal town of Dymchurch. He had hoped to receive backing by June. Another theory is that Miller, who disappeared on Dec. 15, 1944, was shot down by a U.S. Fighter by mistake and that the matter was hidden by authorities. Edwards rejects this theory. He believes Miller's plane came down because of engine failure due to ice in the carburetor.

ODDS & ENDS

The Connecticut Legislature is considering a bill to name the sperm whale the state animal while a move is growing in Calif. to replace the grizzly bear with the gray whale as the official state animal. . . Edwin Link recently received the 6th Annual Neptune Award from the American Oceanic Organization, for his contributions to ocean research, exploration and engineering. . . A barrier of water jets may be used to keep sea nettles out of Chesapeake Bay. The horizontal jets push the nettles to the surface and away from swimming areas. . . The *Golden Hinde II* sailed into San Francisco Bay in March, after a five month voyage from Plymouth, England. The voyage was to commemorate the 16th century voyage of Sir Francis Drake. . . The Englewood Volunteer Fire Dept. of Englewood, Fla., is cleaning up local waterways. Recovered so far: an 85 ft. boat that has been a hazard to navigation. . . During the Aspen winter carnival "Winterskol," the Aspen Diver's Club entered a float — complete with wet suits and mermaid — and won honorable mention.

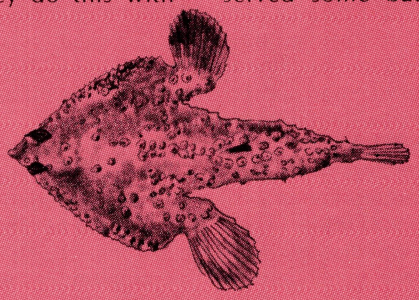
READERS ARE INVITED TO SEND ITEMS TO NEWS BRIEFS EDITOR HILLARY HAUSER, 8490 SUNSET BOULEVARD, LOS ANGELES, CALIFORNIA 90069



The Galapagos Batfish

(Ogcocephalus darwini)

Bizarre, strange, grotesque: this is the odd batfish, a fish that really doesn't behave like a fish at all. Instead of swimming in the normal fashion, the batfish uses its pectoral fins to walk around on the bottom. If danger presents itself it will try to swim, but at best this is awkward and slow. Usually, the batfish will stay in one spot, try to camouflage itself, and prop itself up on these strongly developed fins from time to time to look around. Batfishes are also singular in that they fish for their meals. They do this with the antenna-like fishing pole on the top of their head. On the end of the "pole" is a bait-like lure. The fish wiggles this around to attract small fishes, and since it is usually successfully camouflaged, the unwary prey easily comes in close enough for the batfish to leap into action. □ The Galapagos batfish (*O. darwini*), with its characteristic red lips and white pectoral fins, is only found in the Galapagos Islands. According to Dr. Richard Rosenblatt, curator of marine vertebrates at Scripps, *O. darwini* was named only recently—in 1959—even though it has been relatively common where found. The Galapagos batfish is a member of the Ogcocephalidae family, which is included under the order Lophiiformes, as are the fishing frogs (Antennariidae) and deep-sea angler fishes. These batfishes are not to be confused with the Platacidae family of batfishes, which have the long bat-like fins (SDM, Nov. '74). The Ogcocephalids are tough and scaleless, and their broad, flattened bodies are covered with tubercles and spines, which camouflage them effectively against the bottom. They all have the fishing pole feature. In the batfishes, the fishing pole is actually the first dorsal spine, placed in a depression between the snout tip and the mouth. On the frogfishes the antenna is on top of the snout. The late Steinhart ichthyologist Earl S. Herald said that he observed some batfishes wiggling the lure to the right, with others vibrating it to the left. Other ichthyologists say that the lure of the batfish works up and down, like a piston. □ Batfishes eat small fishes, mollusks, crustaceans, and worms. They sit on shallow, sandy bottoms, sometimes in less than ten feet of water, and are relatively difficult for divers to spot. Some divers have seen batfishes actually throwing sand over themselves in an effort to hide, and sometimes they won't move unless they are prodded. They are not big; the Galapagos batfish grows to about six inches. While its tough, bony hide makes it an undesirable fish for commercial purposes, it is often captured by bottom trawls. Some batfishes have been kept in aquariums, and as soon as small fishes are introduced into a tank with a batfish, the resident *O. darwini* will initiate the fishing behavior—another procedure that is undeniably unique within the fish world.



Top View

Photo By Carl Roessler—Text By Hillary Hauser

Photo taken in 40 feet of water in Bartholomew Bay in the Galapagos. Roessler used a Nikon F camera with 24mm lens, Subsea strobe, Kodachrome II, 1/60 sec. at f11, 15 inches from subject.



Jeppesen Sport Diver Kit

A Complete Learning System

by Nancy Ackerman

Considering the present emphasis on diving safety, pending ordinances, diving regulations and the frequent referral to the University of Rhode Island's statistics on diving, one would also expect a decided interest from the public on educational and teaching modes for diving.

Of particular interest at this time is the Jeppesen Sanderson Sport Diver Kit.

Jeppesen Sanderson is a subsidiary of the Times Mirror Company of Los Angeles and a world leader in the creation and production of training systems. In the past six years this company has designed and produced over: 423,000 textbooks under 28 different titles, 54,000 filmstrips under 156 different titles, 5500 motion films under 170 different titles, and 649,000 tests or exams under 94 different titles.

Jeppesen Sanderson has developed an enormous capability across the spectrum of educational materials and technology which has led them into the creation of courses in pilot training, aviation line service and sport parachuting as well as scuba diving.

The Jeppesen Sport Diver Kit is a learning system containing coordinated text and workbook with a permanent student record folder. The Kit is designed to supplement classroom instruction and water training for scuba certification under the guidance of a qualified instructor.

The philosophy behind this multi-component kit is logical: Meaningful repetition has always been important in the learning process. First, a subject is studied in the manual; then, the corresponding section is completed in the workbook. Following this up is a third repetition in the water. This repetition should pre-condition the student to respond correctly in the open water.

The Jeppesen manual is divided into four categories: The Equipment, The Diver, The Environment and The Dive. Each category is subsequently broken down into five related topics.

The Equipment chapter defines and describes skin and scuba equipment. It explains the use of each piece of equipment plus details maintenance and desirable attributes for selection. This section includes Seeing and Swimming, Warmth and Buoyancy, Breathing Underwater, and Tools and Accessories.

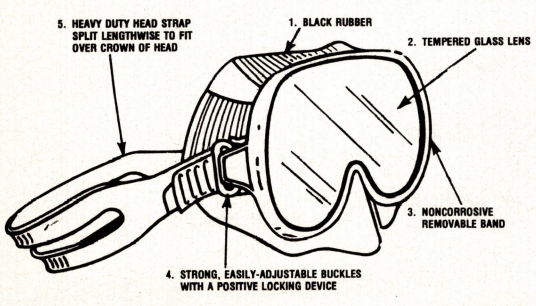
The Diver chapter explains how your body and mind work below the surface, and how water affects them. Diving physics and physiology are introduced here in a simple, comprehensive format. Safety procedures are included with pictures of hand signals, detailed description of first aid procedures, explanations of the dive laws, decompression tables.

The Environment chapter encourages the student to learn more about his underwater surroundings, understand them, preserve them. Included in this section is some ecology, oceanography, geology and marine biology.

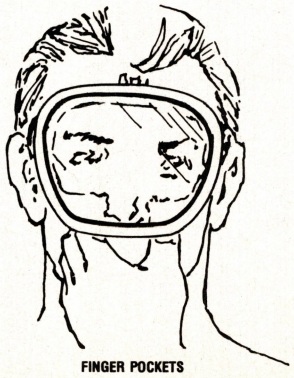
The Dive chapter concerns itself with the different diving activities. This section is broken down into these five sections: Food from the Sea, Collecting, Photography, Specialty Diving, and Careers. The manual refers to both ocean and freshwater diving.

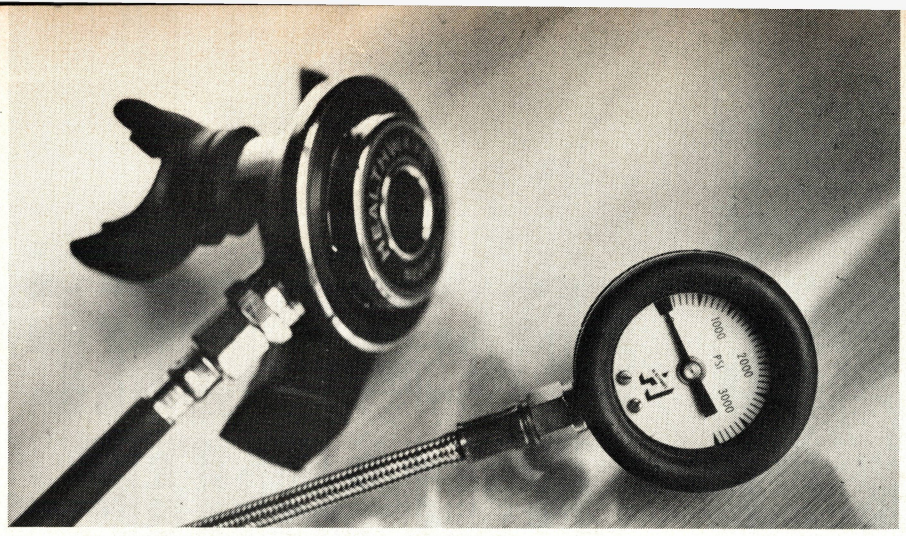
The Jeppesen Sport Diver Kit is a likely choice as the text for a scuba certification class, a handy reference complete with U.S. Navy Air Decompression Tables, air consumption formulas, weights and measures equivalents and much more.

The topic sequence is logical, the text is simple yet informative. The manual gives you a good basic understanding of dive equipment, the underwater environment and how it affects the diver, and the activities divers have become involved in. The coordinated exercises in the workbook reinforce the learning in the manual, as does water training. All in all, the Jeppesen Sanderson Sport Diver Kit at $7.95 proves to be a complete learning system, ideal to complement a scuba training class. If you are interested in the Kit, contact: Jeppesen Sanderson, 8025 East 40th Avenue, Denver, Colorado 80207. Your students will be glad you did!




NOSE POCKET


FINGER POCKETS



Healthway's Submersible Pressure/Depth Gauge

AN EXCLUSIVE SDM PRODUCT REPORT

by Jack McKenney

It was only a few years ago that submersible pressure gauges were considered an accessory piece of equipment. Now, every scuba instructor worth his salt teaches that they are a very necessary and integral part of a regulator — double hose as well as single hose models. The submersible pressure gauge allows a diver to monitor the air in his scuba tank at all times during a dive.

Due to the configuration of these gauges — generally a two and a half foot long hose with a gauge weighing upward from eight to ten ounces on the end — they often end up being dragged along a rocky bottom while diving, thumped against a tank during transportation and caught in seats or benches on boats. Paul Tzimoulis once witnessed a car trunk lid being slammed down on one damaging the hose beyond repair.

For the most part the majority of submersible pressure gauges now on the market are rugged instruments and, if properly cared for, will give the diver years of service. But one part of the gauge that usually ends up having to be replaced after a few seasons use is the high pressure hose. Typically, due to the natural bending of the hose at the junction where it screws into the first stage, the hose tends to break down and form a bulge. When this happens it should be replaced.

Healthways has just introduced a new high pressure hose that eliminates this problem. The outside of the hose is a strong, yet flexible braided stainless steel (series 300) that encloses a Teflon® tube. It is virtually unaffected by aging, has unlimited shelf life, won't crack from ozone, and comes with a "forever" guarantee. Teflon® is a plastic called polytetrafluoroethylene, and is chemically inert to all forms of chemicals except the fluorine family and molten sodium. And the only time a diver would have to worry about molten sodium is when he's diving in the nearest active volcano . . .

Operating temperature of Teflon® is −65°F to +450°F, so in effect the Teflon® tube is also unaffected by the extremes of temperature that a diver will ever encounter while diving. During high pressure tests at Healthways the hose wouldn't burst until 14,000 to 14,500 psig — certainly a tremendous safety factor. The manufacturer guarantees the hose 100% to 12,000 psig and before leaving the Healthways plant many of them are proof-tested to 6000 psig.

The gauge face is easy-to-read black numbers in numerical increments of 500, 1000, 2000 and 3000 against a light yellow luminescent background. Black arrows mark each 500 increment and black lines represent the hundred marks. The gauge reads to 3000 psig, but allows for an additional 500 psig beyond the working pressure. ANSI (American National Standards Institute), an independent agency which makes recommendations to the federal government, permits gauges to read a maximum of 25 percent beyond the rated surface working pressure. At 500 psig the gauge is accurate to plus or minus one percent and goes to an allowed extreme of plus or minus five percent of full scale at full scale.

On the reverse side of model 1628 is a capillary depth gauge that reads to 250 feet. It also features black letters on a light yellow face, but more important, the facing behind the plastic capillary is luminescent as well, allowing easy reading of the water column, too.

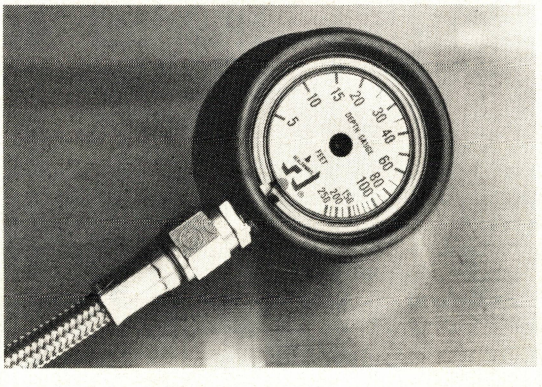
A blowout plug for the ABS (Acrylonotrole — Buladiene — Styrene, a high impact plastic) housing is set to blow at 45 psig. Should a slight leak develop in the bourdon tube the case won't become a bomb. Instead, the plug will blow at this relatively harmless low pressure relieving internal pressure.

A snug-fitting shock cover fits over the gauge and a newly designed stretchable natural rubber and neoprene blend strap, which secures to the in-fitting beneath the gauge, yet easily adjustable to any spot on the hose, secures the gauge to a harness strap. All rubber components have ozone and ultraviolet inhibitors.

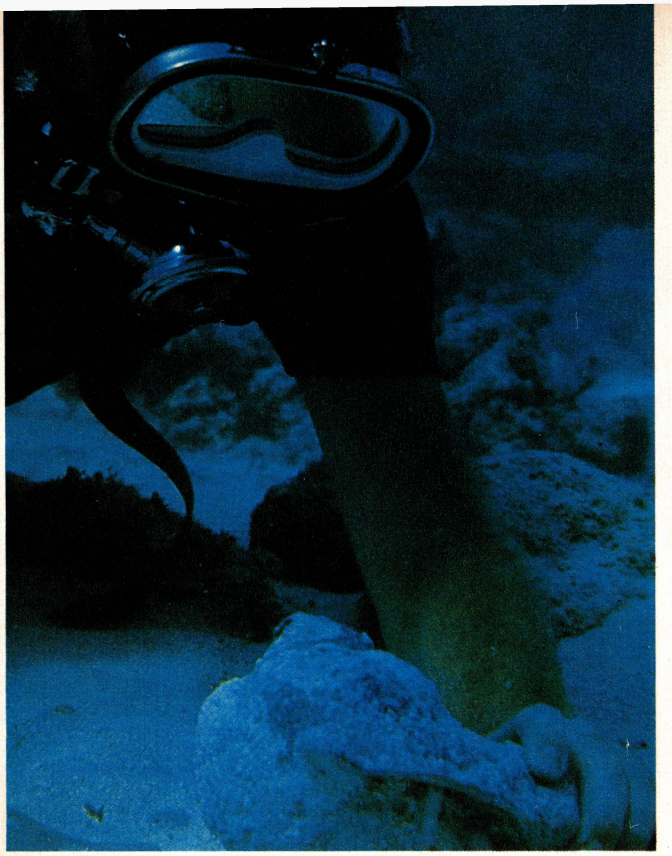
As a test I put the stainless steel hose in a vise, squeezed it down as hard as I could, left it overnight and the next morning found that although the hose was dented, after I straightened it out in the vise it was still serviceable. Later I was talking with Dan Merrifield, Healthway's engineer, who told me he made the same test. But after taking it out of the vise, he hydrostatically subjected it to a series of eight pressurizations to 8500 psig and a ninth pressure test to 12,000 psig with no failure. That's a pretty impressive test!

The gauge retails for $49.90 and is also available in metric calibrations. Without the capillary depth gauge, retail price is $47.50. Ask to see it at your favorite pro dive store.

The stainless steel high pressure hose, catalogue #1630. can be purchased separately for $18.95.



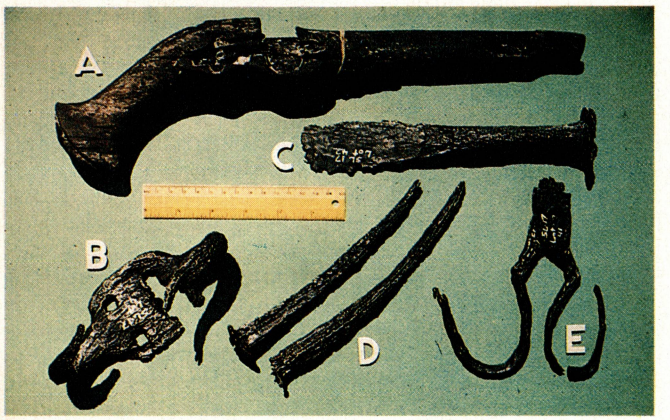
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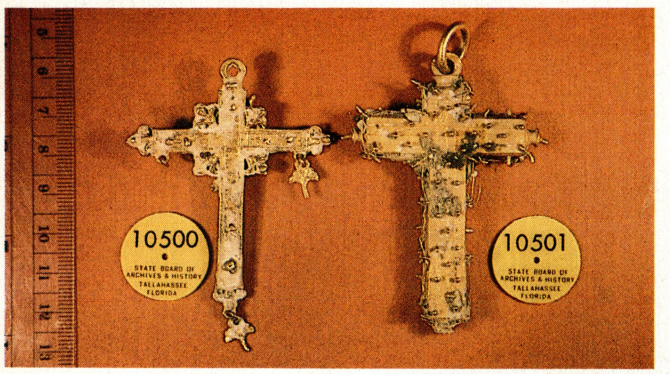
photograph by Paul Tzimoulis

TREASURE SALVAGE ARCHAEOLOGY

By Bill Barada



photography courtesy of Florida U/W Archaeology Research Section



An incident off Vero Beach, Florida in 1964 kicked off a treasure salvage controversy that has since raged for over ten years. Archaeologists claim that Florida's historical heritage is being destroyed by the techniques of treasure hunting salvage operators; treasure hunters claim that politicians are using the state antiquities laws as an excuse to take over the treasure salvage business for themselves. The entire controversy may be converted into chaos by a Supreme Court decision this fall.

In 1964 Kip Wagner and his associates dug 1½ million dollars in gold doubloons and pieces of eight from the remains of one of the 1715 fleet of Spanish treasure ships wrecked off Vero Beach, Florida. The event kicked off a treasure salvage controversy that has raged for ten years. Involved are charges of fraud and forgery, an investigation by the Securities and Exchange Commission, and a dispute over who-owns-what that has reached all the way to the U.S. Supreme Court.

Archaeologists claim that Florida's historical heritage is being destroyed by the bulldozer and dynamite techniques of treasure hunting salvage operators. Treasure hunters claim that some politicians and political appointees are trying to use state antiquities laws as an excuse to take over the treasure salvage business for themselves. Politicians claim they are simply trying to protect Florida's historical and archaeological artifacts for future generations. And the public, as usual, is totally confused, with the majority of Florida citizens unaware that they are being ripped off from a heritage handed down from the Spanish conquistadores.

One state archaeologist, Carl Clausen, has quit in disgust, charging that Florida is losing around 70 to 80 percent of the potential information from historical shipwrecks. His replacement, W. A. "Sonny" Cockrell, is trying desperately to bring some sort of order out of chaos in spite of threats, intimidation, and charges of unreasonable interference with the rights of citizens and of free enterprise to exploit the resources of the sea.

Florida's treasure salvage industry is no penny ante game. The total number of shipwrecks accumulated along the coast since the discovery of the New World has been estimated at anywhere between 1200 and 4000. Around 30 percent of these are believed to be ships which sank during the 16th, 17th and 18th centuries, the period of exploration, colonization, and the development of overseas commerce between Europe and the Americas. This was also the period when tremendous quantities of gold, silver, jewels and other treasures were collected in the New World and shipped back to Spain. Each year huge fleets of galleons loaded with tons of Aztec and Inca



OR VANDALISM?

gold and silver collected from possessions in Mexico and South America set sail for Madrid. A significant number of these were regularly lost due to storms, pirates, military action and navigation errors. Sometimes an entire fleet was caught in a hurricane and the galleons with their tons of gold and silver were scattered over the reefs of Florida. This is what happened to the 1715 fleet in which an estimated eleven vessels were driven aground and their wreckage spewed along Florida beaches all the way from Jupiter Inlet to Sebastian Inlet.

Prior to the discovery of the 1715 treasure wreck, Florida had followed the practice of issuing leases for salvage in sections of the Gulf and the Atlantic with the provision that 25% of all treasure recovered would be turned over to the state. However, either no treasure wrecks were discovered, or they were kept awfully quiet, because the only objects reported were a few cannons, anchors and similar items.

Publicity generated by Wagner's treasure find blew the lid off any hope of secret salvage operations. Reports stated that there were eleven galleons in the fleet, all loaded with treasure, and that a total of 100 tons of gold, silver and jewelry were scattered along the coast. Treasure hunting suddenly became big business and Florida became a hotbed of rumors and treasure stories that rivaled the pirate days of the infamous Jean Laffitte and Blackbeard.

The lure of gold has always attracted fast-buck artists, swivel-tongued con men, scheming gamblers and devious politicians as well as swashbuckling and hard working adventurers. In Florida, gold fever was combined with the mystery of sunken treasure, the romance of pirates and Spanish galleons, and the adventure of diving in tropical waters. The mixture was like a magnet that pulled fortune-hunting opportunists from across the world.

The Florida Keys swarmed with colorful characters. The entire coastline buzzed with rumors and intrigue. Old time divers suddenly produced battered pieces of eight, gold doubloons and solid bars of bullion purportedly taken from secret treasure wrecks they had been working on the sly. Big time investors roamed the state with promises of quick cash available to finance legitimate treasure salvage deals. Political and legal manipulations and maneuvering pervaded city and county governments and invaded the State Capital in Tallahassee.

In 1965, the year following discovery of the 1715 treasure fleet, the Florida Legislature passed an "Antiquities Act" which proclaimed that all artifacts and treasure trove abandoned on state-owned submerged lands were the property of the State of Florida.

The Act made it a criminal offense for any person to either search for, or attempt to recover, any relics from the bottoms of rivers, streams, lakes, bays, or the Atlantic and Gulf of Mexico.

The stated purpose of the Archives and History Act is to protect and preserve historic sites and properties for the people of Florida. The law is all-encompassing and is so strict that a person could be arrested for picking up an old bottle on the beach, recovering an old animal bone or an Indian arrowhead from a river, or even for skin diving in the vicinity of a sunken wreck. The Director of the Division of Archives and History is responsible for implementing and enforcing the law — and a marine archaeologist is charged with supervising and directing the recovery of historical artifacts and relics from all sites, including shipwrecks.

Such antiquities laws are not new or unique. Florida's law is essentially the same as that of the federal government and a number of other states'. In many foreign countries such as Mexico, Greece, Turkey and Italy, archaeological sites are considered a sacred trust which are not to be touched by anybody except recognized and accredited experts working under strict government supervision and control. In these countries souvenir or treasure hunting is a serious offense and this type criminal is looked upon as a grave robber.

The difference between Florida's antiquities laws and those of other states and other countries is that Florida permits the Division of Archives and Records to enter into salvage contracts with treasure hunters.

Virtually any scientist will admit that treasure hunting and archaeological excavation are incompatible. The ar-



NOTICE

THE LIMITED NUMBER OF HISTORICAL PERIOD SHIPWRECK SITES IN FLORIDA WATERS CONSTITUTE A SCIENTIFICALLY AND HISTORICALLY VALUABLE AND IRREPLACEABLE RESOURCE PROTECTED BY THE FLORIDA ARCHIVES AND HISTORY ACT, CHAPTER 267, FLORIDA STATUTES.

UNAUTHORIZED REMOVAL OR POSSESSION OF ARTIFACTS FROM OR DISTURBANCE OF SHIPWRECK SITES CONSTITUTES A MISDEMEANOR PUNISHABLE BY UP TO ONE YEAR IMPRISONMENT OR $500.00 FINE AND SEIZURE OF ALL BOATS, EQUIPMENT AND INSTRUMENTS USED IN CONNECTION WITH THE VIOLATION.

RULE 1A — 0.01 OF THE ADMINISTRATIVE CODE, ADOPTED PURSUANT TO PROVISIONS IN CHAPTER 267, FLORIDA STATUTES, WHICH BECAME EFFECTIVE OCTOBER 30, 1970 PROVIDES AS FOLLOWS:

chaeologist is looking for pages of history revealed by bits and pieces of artifacts contained in wreckage and ruins. To him the position of a broken piece of pottery, an ancient tool, a piece of skeleton, or the presence or absence of tobacco, may be more significant than a chest full of gold. To the true scientist, gold and silver coins are simply additional pieces of a massive historical puzzle he is trying to put together.

In contrast, the treasure salvor is usually in a business venture, often with financial backers who are only interested in the profit to be realized from their investment. To these people the painstaking, methodical work and record-keeping which is essential to scientific investigations are a waste of time and cost so much money they could lead to backruptcy.

Thus, Florida's antiquities law led to suspicions of skulduggery and political chicanery under the pretext of archaeology.

In July of 1966 the Florida Association of Marine Explorers, consisting of a group of treasure hunters and salvage experts, was formed to do battle with the political forces in Tallahassee. Among the charges leveled by members of this group were:

1. The Spanish treasure ships had lain buried off Florida's coast for hundreds of years and no state official had shown concern for their archaeological and historical importance until a massive treasure was discovered.

2. An estimated 2,000 to 4,000 shipwrecks have accumulated in Florida waters since discovery of the New World. Yet, the only wrecks that have aroused any official interest are those of the 16th, 17th and 18th century treasure fleets. The state has never funded or promoted archaeological excavations of ancient wrecks other than those discovered and worked by treasure hunters.

3. The Antiquities Board is fostering a closed shop and plays favorites in the granting of search and salvage contracts. They claimed that, in 1966, more than 100 persons and firms had formally applied for contracts and the state had arbitrarily limited the number it would issue to eight.

4. Certain state politicians and their appointees want to take over the treasure salvage business. The state learns of treasure wreck locations from applications, and learns salvage techniques from experienced companies, then removes these people from the picture by refusing to issue contracts.

The Board of Antiquities issues two types of contracts: One is an exploration contract which grants permission to search for a treasure wreck in a specified area of ocean and charges an annual fee of $600. The other is a contract for salvage granted for recovery of articles from a particular ship, or fleet of ships, in a specified area and charges a fee of $1200 per year. This contract is good only for one year and is subject to renewal "at the option of the parties upon such terms and conditions as are agreed upon."

The treasure hunters charged that these rules forced them to divulge the location of secret wrecks with no assurance that the salvage contract would not be awarded to somebody else. The one year contract was claimed to be a lever which permitted state officials to cancel contracts after treasure was discovered and reissue the permit to favorite salvage companies.

At least some of these charges were verified in a Miami Herald news story in May of 1964 in which ex-governor Farris Bryant was quoted as stating that the profit motive was the main reason the state decided to get into the treasure hunting business. The governor is reported as saying that past leasing methods did not produce a fair share of the booty for the state. The new rules required that a state agent be aboard all treasure salvage operations and would make sure that the state got its 25 percent of the loot.

The law does not specify that this state agent must have any training or qualifications whatsoever in evaluating archaeological or historical objects or in the record keeping and recovery techniques which are essential to scientific research.

Thus, it appears that charges of sham and pretext leveled at Florida's antiquities law were well founded, and that the state was primarily interested in treasure salvage for profit.



Florida's treasure salvage industry is no penny ante game – the total number of shipwrecks along the coast has been estimated at between 1200 and 4000. The difference between Florida's antiquities law and those of other states and other countries is that Florida permits the Division of Archives and Records to enter into salvage contracts with treasure hunters. Sonny Cockrell, State Underwater Archaeologist and Administrator shown at left, is trying to be considerate of both the rights of citizens and treasure hunters.

In this political atmosphere, supercharged with suspicion, distrust and accusations of prosititute science for profit, the results were predictable.

State agents had no authority and no control over recovery methods. They could only watch, and try to make sure that all treasure recovered was reported. However, they were powerless to verify or authenticate the recovery of true antiquities and objects of art which, if authentic, were often worth five to 25 times their value by weight. Truly rare art objects sometimes brought fabulous prices on the open market.

Treasure hunters began moonlighting and bootlegging their finds. Smuggling became commonplace. Virtually every old time diver and dive shop in the Keys had a stock of authentic Spanish coins and other relics which were offered for sale to a gullible public. Imitation treasure objects in the form of gold doubloons, pieces of eight, bars of gold and silver, jewelry, gold chains, gems and similar objects flooded the market. One treasure salvage company established a museum with elaborate displays of fabulous treasure purported to have been recovered from authentic wrecks. Visitors were treated to a well-oiled sales pitch designed to entice investment in treasure expeditions. Hardheaded businessmen are often conned into foolish acts by the sight of treasure. One normally sound businessman is reported to have accepted a $3000 gold bar as collateral for putting $14,000 into a treasure-stock deal. And the bar may have been counterfeit.

In the cutthroat competition, and the race to be first in finding a fabulous treasure, salvage companies often utilized methods as destructive as dynamiting to uncover a payoff in gold and silver. Most ancient wrecks are buried under 15 to 20 feet of sand and rubble and must be located by magnetometer survey, then uncovered by digging or dredging away the overburden. The use of "blasters" or "mailboxes" to remove the overburden became commonplace. These are deflectors, or tubing, placed over boat propellers to divert the propwash downward. A strong current is created that washes away loose sand and rubble.

One salvor bragged that his twin, 26-inch prop-blasters can dig a hole 30 feet wide and 20 feet deep in 30 feet of water depth. This is potentially more destructive to marine life than dynamite. And the dredged up silt is more damaging to corals than blasting gelatin. Yet, treasure-hunting boats were permitted to blast holes all over the ocean bottom wherever a wreck location was suspected.

Few records were kept, and W. A. Cockrell, State Marine Archaeologist, says that most treasure salvors don't even know which areas they have already explored or which holes they have already dug. He was amazed at how many companies went over and over the same areas surveying and re-surveying with expensive, time-consuming magnetometer checks, then working and reworking the same holes over and over again.

Needless to say valuable historical artifacts such as ceramics, art objects, and fragile items were destroyed, and virtually all evidence of archaeological significance was lost.

Not all treasure salvors are of the reckless breed. A few are amateur archaeologists in their own right and recognize the value of ancient objects and the need to preserve and protect historically important items. However, the gold-fever greed encouraged by the attitude of some state officials insured that careless and conniving operators would survive along with those who were conscientious and careful. Efforts to slow down the destruction and initiate more systematic and scientific recovery methods were met with political intimidation and demands that the offending official be fired.

Carl Clausen refused to take responsibility for wanton destruction of the people's heritage.

Sonny Cockrell admits that past methods were very destructive. However, Cockrell claims that conditions have changed drastically in the past few years and that he and his staff now have adequate control over operations to insure the best possible archaeological information and records under the legal restrictions that prevail. He admits that, in the best of all possible worlds, archaeological excavation would be undertaken only by scientific experts and state supervision. But, given the state's policy of contracting to private salvors, he believes present methods and regulations are beneficial to both parties. Some of the improvements Cockrell cites are:

1. The staff now consists of trained personnel who know what to look for and how to make sure that operations are properly conducted.

2. The state now has an efficient preservation laboratory and salvors no longer need wait five years before receiving their share of the treasure. In the past, the state was accused of bankrupting salvage companies by tying up the treasure until creditors closed in. Spoils are now divided annually.

3. Salvors are required to use an accepted grid pattern during explorations and make a magnetometer survey of the entire area before salvage begins. They are also required to keep detailed records and to conduct salvage operations according to specified procedures. Thus everybody will know which areas have been worked and costly duplication will be eliminated.

4. The common complaint from treasure hunters that only big time operators with political pull can get a treasure salvage contract makes Cockrell furious. This may have been true in the past, but he now has a comprehensive list of contractors that includes doctors, dentists and other individuals who are working treasure sites on vacation or part time. Cockrell claims that 95 percent of Florida's territorial offshore lands are still open for treasure search and salvage contracts.

5. The disclosure of search and salvage sites to the State of Florida does not mean giving away a secret treasure site to preferred state contractors. Cockrell says that all site information received by the State is confidential. This information becomes part of a computerized site file which is utilized to protect valuable areas from destruction by developments such as offshore oil drilling. Unless such ties are known the state cannot protect them.



However, he admits that without political backing the entire archaeological protection program can be scuttled by behind-the-scenes maneuvering, political lobbying, and the "fix-it-for-you-boys." Cockrell claims he now has the political backing. But, nobody can predict how long such political support will last.

Other developments may have influenced the climate in favor of science and archaeology.

The flood of imitation treasure objects damaged the value of authentic treasure finds because no methods were available to document the legitimate treasure. This, plus reports that a number of Florida wrecks had been salted with treasure from other areas, and with imitation objects, frightened potential investors and financial backers (which is the true source of most treasure hunting profits). One treasure salvage company has been accused of issuing so much imitation treasure as collateral for investment in expeditions that this company is under investigation by the Securities and Exchange Commission for possible fraudulent stock sales.

The publicity resulting from this announcement has really made treasure hunting investors skeptical and skittish. As a result, legitimate salvors are happy to have state agents on hand to verify the authenticity of their finds.

The entire archaeology-treasure controversy may be converted into chaos by a Supreme Court decision due this fall. The three-mile offshore territory claimed by Florida is under dispute by a major oil company. If Florida loses, much of the offshore land now claimed by the state will become federal property. And most of the treasure wrecks now being worked under state contract will lie in federal waters.

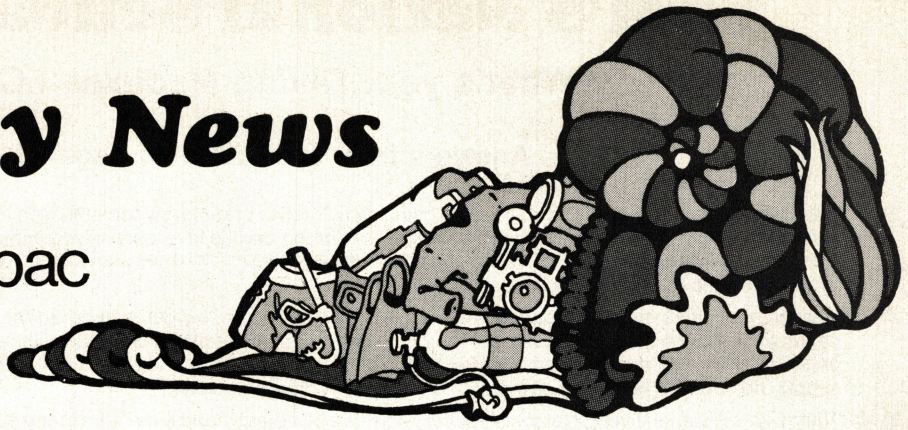
The U.S. government has not yet entered into salvage contracts with private treasure hunters and the entire squabble may start all over again in Washington, D. C.

Another legal question which is potentially explosive revolves around the state's right to market the heritage of Florida citizens as an ordinary commodity. Is the state violating a sacred trust in putting art objects and treasure trove up for sale? What dollar value can legally be placed on these underwater finds that constitute a vital portion of the state's historical tradition and records?



Industry News

Sherwood Selpac



By Nancy Ackerman

Who is Sherwood Selpac?

That's a good question!

Basically, Sherwood Selpac Corporation is a company involved in manufacturing precision valves and regulators for gas control. They cater to many different industries — medical, recreational vehicle, welding, as well as the scuba diving equipment industry. You might see their valves on a chlorine cylinder behind the local swimming pool, on a cylinder to a welding assembly, or on a propane cylinder on the back of a camping trailer.

They began as the Aluminum & Brass Company, a foundry that was started about the turn of the century. The Sherwood Valve Division emerged in 1923, and later Sherwood Selpac. The Corporation is now a subsidiary of Hill Acme Company of Cleveland, Ohio, a manufacturer of capital, or heavy duty, equipment.

The recently appointed president of Sherwood Selpac is Orin Lindquist; the marketing manager of the company is Francis Skop; and the customer service manager, also newly appointed, is Joe Pirrone. The design engineering is done on the premises to facilitate the need to not only keep up with their businesses and customer needs, but to better anticipate these requirements.

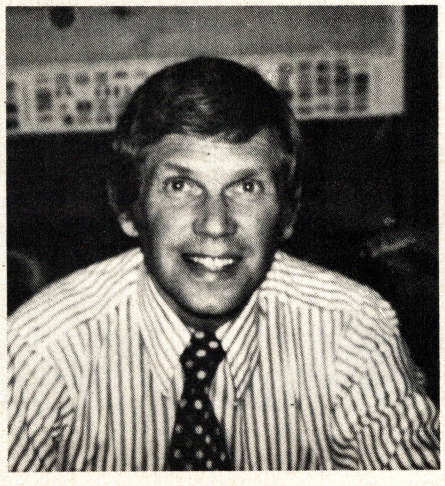
For years, Sherwood Selpac has supplied valves for leading scuba gear manufacturers. Nothing was made or marketed in their own name. They are one of the few valve manufacturers with their own in-house forging capability. To date, they have made over one million breathing valves. They were the first to develop the underwater piston regulator, were one of the developers of the single hose regulator, and can claim the first successful closed system underwater sonic alarm. With these accomplishments behind them, they decided, early in 1974, to begin marketing their own equipment.

Their catalogue includes three regulators, tanks, several valves, and tank/valve combinations. The new SRB 4100 Sherwood regulator is made for 4000 psig service pressure; the SRB-3000 Sherwood regulator assembly is made for service up to 3000 psig. Sherwood Selpac also has a Demand Regulator Assembly that fits into any first stage for octopus breathing. The regulators have undergone both laboratory and underwater testing. Their tanks come galvanized or vinyl-coated and their valves have 40 years of experience behind them.

Their facilities at 120 Church Street, Lockport, New York, now occupy 70,000 square feet, and they employ 230 people. They have four distributors around the United States that are responsible for supplying their products.

Even though Sherwood Selpac has been making dive equipment for a long time, this is their debut in making equipment and marketing it in their own name. With their goal being to plan a quality control program by ". . . the most direct and economical route to production and quality requirements," Sherwood Selpac has a good start. Their unusually broad experience in engineering, design, procurement and manufacturing will allow them to achieve this goal. SKIN DIVER would like to welcome the new kid on the block, and wish them good luck in their endeavors.

Francis E. Skop, president



L. Orin Lindquist, marketing manager



Joseph S. Pirrone, cust. service manager



SDM'S National Scuba Exam

What's your Diving Medicine I.Q.?

Answers from questions on page 25.

1) A. The diver could lose consciousness before being stimulated to breathe. Hyperventilation reduces the carbon dioxide in the system, which provides the stimulus to breathe. Lowering the carbon dioxide level excessively with prolonged hyperventilation could enable a diver to hold his breath until all the oxygen was used and unconsciousness could occur without being stimulated to breathe! Limit hyperventilation to three or four breaths.

2) B. Ascending. Due to increased partial pressure of oxygen at depth, oxygen can be dissolved in the blood fluids and provide body needs even though the hemoglobin, the major oxygen carrier in the blood, is tied up with the carbon monoxide. The reduced partial pressure of oxygen during ascent quickly brings on acute symptoms and can cause unconsciousness. If in doubt about your air supply, don't use it. Know the symptoms of carbon monoxide toxicity.

3) C. Vary with individual divers. Narcosis effects each diver differently and even effects the same person differently on different days. Individual susceptibility varies. Do not believe narcosis simply occurs at a specific depth; avoid narcosis. Ascend if any strange feelings come over you.

4) A. Oxygen is toxic under pressure. Breathing pure oxygen at depths as shallow as 30 feet can lead to convulsions. Diving cylinders should be filled with compressed air only.

5) A. Vertigo. Cold water entering the ear through a ruptured eardrum upsets the organs of balance and causes vertigo. It lasts until the water is warmed to body temperature. Prevent rupture by equalizing pressure early and often. Stop descent if pain is felt.

6) A. Carbon dioxide toxicity. Excessive breathing resistance leads to a buildup of carbon dioxide in the lungs and tissues causing an increase in respiration without increased activity, fatigue and headache, all symptoms of carbon dioxide toxicity.

7) A. Holding the breath on ascent. As the surrounding pressure is reduced during ascent, the lungs expand. Unless the expanding air is vented by exhaling, the lungs will reach maximum volume and rupture.

8) A. 0 to 15 feet. The nearer the surface when ascending, the greater the rate of change of pressure. During any ascent, exhale more forcefully the closer you are to the surface.

9) C. Carbon dioxide. Buildup of carbon dioxide in the system provides the stimulus to breathe. Many people mistakenly believe the stimulus to breathe comes from a lack of oxygen in the system.

10) B. Ascend a few feet, equalize pressure and continue descent. Once pain is experienced, equalizing is very difficult or impossible. It is necessary to reduce the pressure by ascending a few feet, adding more air to the air spaces and then continuing the descent.

11) C. Ear and sinus squeezes. A cold causes mucous membrane swelling in the sinus passages and can plug the eustachian tubes to the ears, preventing or obstructing equalization. Do not dive with a cold, do not use medications to clear passages to dive with a cold.

12) B. More water vapor is exhaled than inhaled. Diving cylinders are filled with very dry air to prevent corrosion inside the cylinder and for other reasons. Each breath taken by a diver is warmed to body temperature and humidified to nearly 100%. The moisture added to the air is lost with each exhalation leading to dehydration. Drink fluids between dives.

13) B. Never hold the breath during ascent. See question number seven. Lung rupture is one of the greatest hazards in diving and must be understood for prevention. Expanding air must be exhaled. Breathing normally during ascent will allow expanding air to escape.

14) B. Intoxication. Narcosis effects judgement, coordination and physical ability, and is not to be used for fun or thrills. The effects are obvious and dangerous and can be easily reversed by ascending to shallower water.

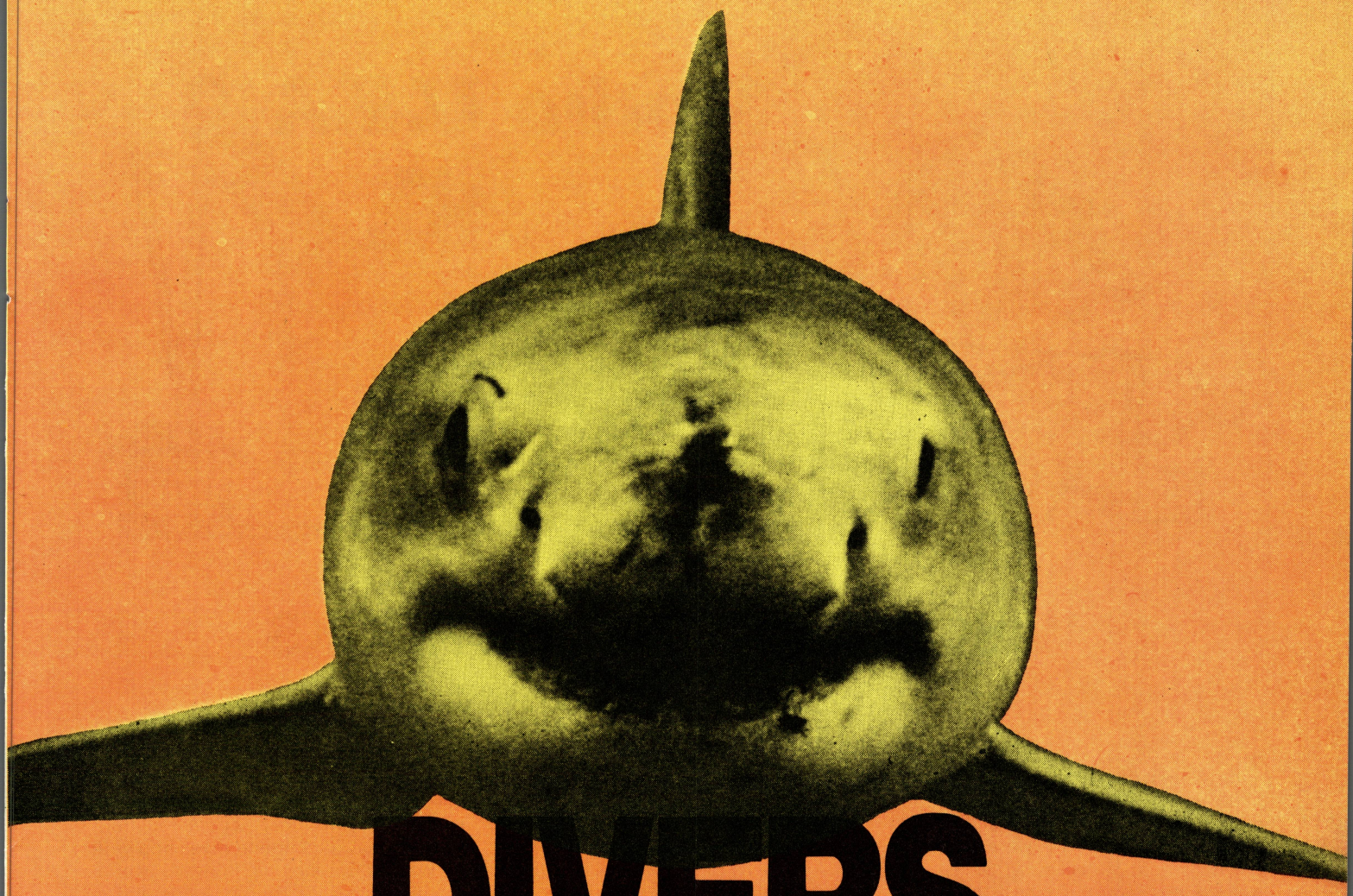
15) B. Employ a different kick. Stretching and massaging the cramped muscle is good to get rid of cramps, but will not keep the cramp from recurring. Using a different kick will load different sets of muscles and can keep a cramp from recurring.

If you answered 14-15 questions correctly, you have a good understanding of physiology. If you missed three or more, it's time to brush up your knowledge, and if you missed five or more it's time for you to enroll in a refresher course and update your knowledge of Diving Medicine. Next month we'll be asking questions about Diving Emergencies.

FISHTALES

BY BRON SMITH





DIVERS BEWARE

At this very moment, state and local legislators are drafting, proposing, or have already passed laws in three different states to restrict your right to dive. It started in Los Angeles, and is spreading fast.

Some private interest groups, property owners and local politicians are also trying to close whole beaches and other dive sites for the sake of financial gain or personal animosity against divers.

A National Scuba Advisory Committee has been formed to fight this cancerous growth. The committee represents all citizen divers, certification agencies and manufacturers who want to preserve the sport from restriction and possible extinction.

The committee is established and already fighting adversaries of our sport with facts, statistics and "legislative friends," but we need money. We cannot hope to succeed without support, even if it's only $1.00.

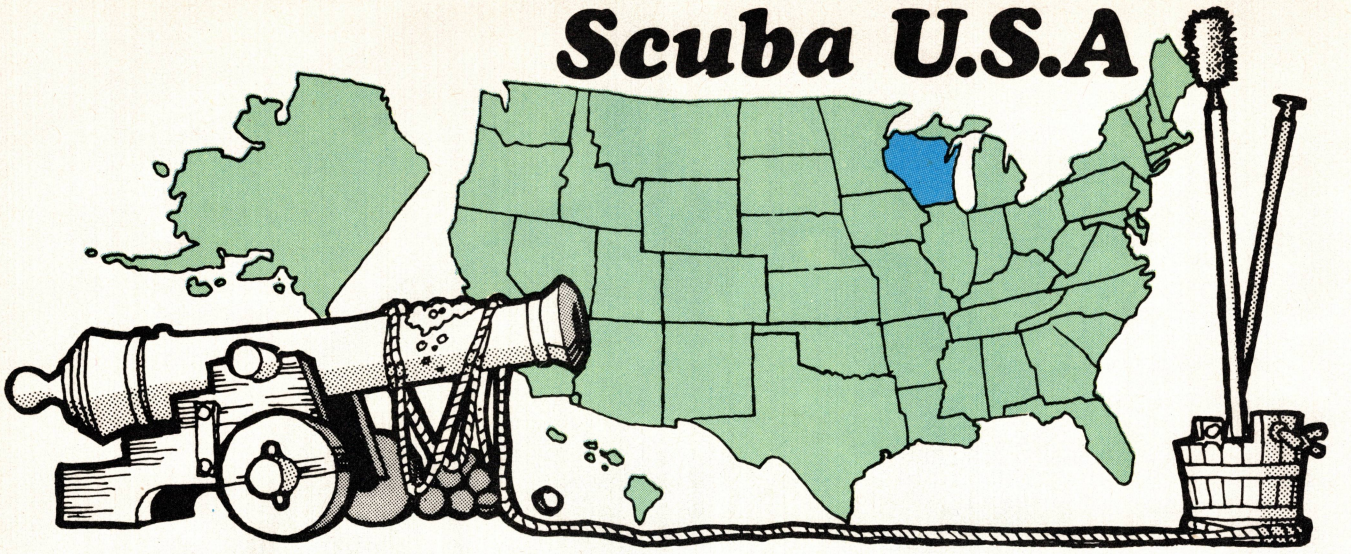
National Scuba Advisory Committee
P.O. Box 1120
Belmont, California 94002

Here is my contribution _____

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Address _____

City _____ State _____ Zip _____



WISCONSIN'S ON THE ROCKS

By Arthur E. Green

Thirty-eight degrees, 115 feet, 100 feet, 1500 psi; it's time to start up, up over the rock cliffs, up through the black-green water. Forty degrees, the water is turning grayish-green; 50 feet now; 20 feet, the water is much warmer, finally the surface and the shore. Now up a 40 foot cliff, and you are there — where you started — at On The Rocks, the midwest's most unique and rewarding diving lodge.

Located 80 miles from Green Bay on Highway 57 at the tip of Door County, the strip of land that separates Green Bay from the rest of Lake Michigan, On The Rocks offers the diver every challenge he or she can ask for. Just a few hundred yards out from the lodge, you can dive to 130 feet into Death's Door Strait, or for those who like shallow diving, there are many bays within a mile of the lodge no deeper than 40 feet. The real lure of On The Rocks is the many shipwrecks located in the surrounding area. Door County is a wreck diver's paradise, with well over 300 known sinkings in the area and many more to be discovered.

Door County forms a barrier of shoals, tricky currents, and violent storms that have been sending ships to the bottom for the past 200 years into a veritable deep freeze. Many of these ships are still in the same condition as the day they were sunk. Because of the cold temperature and the fact that it is fresh water, there has been little deterioration of the ships or their cargoes. Among the cargoes waiting to be discovered are Christmas trees, pottery, fence posts, coal, and five million dollars in gold. During the Civil War a ship carrying the gold was attacked near Poverty Island, north of On The Rocks, and the crew dumped the gold over the side in five wooden chests, that have yet to be recovered. (SDM March, 1969)

For those wreck divers, or just regular divers, there is everything that can be asked for at On The Rocks. The lodge overlooks Death's Door Strait, which is one of the main passages to Green Bay from Lake Michigan, and because of its tricky currents, and sudden storms with 100 mile an hour winds, lives up to its name as the graveyard of many ships. Sitting among pine and birch trees, the lodge offers a rustic setting that is hard to describe. The lodge offers both private rooms and dormitory accommodations and also has a complete dive shop with air station. Cooking facilities are available in the main dormitory lodge and in the two A-frame buildings that feature private rooms.

The entire lodge accommodates 50 people. In the main lodge, there is room for 26 people, 18 in a dormitory situation. Each of the two cottages holds 12 people, with room for four people in each of their private rooms. Dorm bunks are $5 a night, and private rooms run



On the Rocks is a most unique and rewarding diving lodge located at the tip of Door County, 80 miles from Green Bay. The area is a wreck diver's paradise.



photography by Author

from $15, $18, $21 or $24, depending on whether one, two, three or four people share the room. Air fills are only $2.50, and the dive shop has complete rentals from suits to tanks, regulators, weight belts, and so on. There is also a qualified dive instructor available.

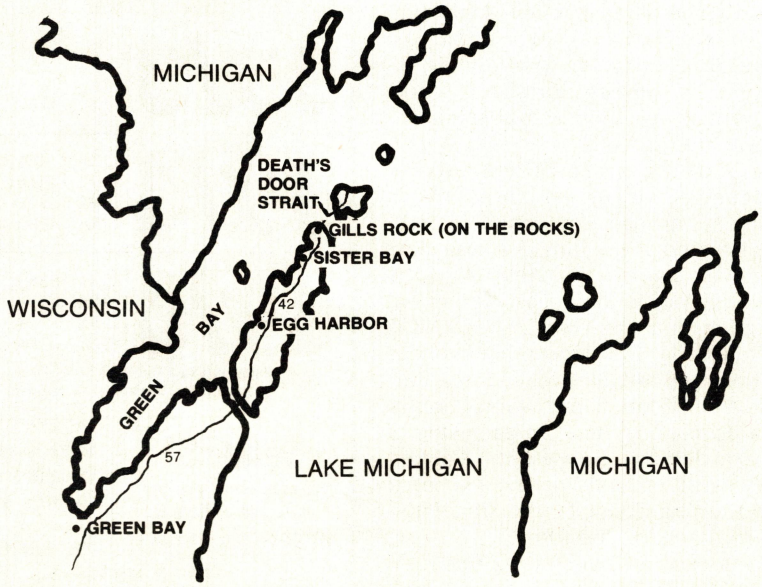
The main lodge has a large lounge area which will find many divers sitting around its toasty fireplace in the evening planning the next day's dives, or out on the balcony that overlooks the 40 foot cliff dropping down to the water's edge. If the coffee table in the lounge looks like part of a ship, it should, because it is the rudder from a bygone sailing ship. Many artifacts brought back by divers have been restored and help decorate the lodge and the grounds around it. Among them are anchors, pieces of chain, pottery, deadeyes, and planks.

Wreck diving has become the main interest in the area, because of the already found, and to be found, wrecks. Hedgehog Harbor, Pilot Island, Poverty Island, Washington Island, and Garrett Bay are all familiar places to the Door County divers. The *Fleetwing* lies in Hedgehog Harbor along with four other wrecks; Whaleback shoals has the *Hacket*; and Washington Harbor, the *Louisiana*. But these are just a few of the known wrecks in the area. Each year new wrecks are found by divers, adding to the maritime past of the area. A maritime museum has been built in Gill's Rock, the town nearest to On The Rocks, to preserve the artifacts and history recovered from these icy waters.

Each day the *Scuba Queen Too*, loaded with novice and experienced wreck divers, filled with excitement and anticipation, leaves from the lodge for a new day's diving and hopeful discovery. Since the lodge and dock are at the tip of the peninsula, there is always a lee side to dive in, no matter which direction the wind is coming from. Water visibility is about 20 feet, but, in some bays, can be as good as 70 feet. Wherever the diving, you will find wrecks, and the remains of past sailing mishaps, in waters from 20 to 120 feet deep. By accident you may run across an undiscovered wreck, or you may discover that missing golden treasure of the Civil War, or some other unknown treasure awaiting the adventurous diver.

The *Scuba Queen Too*, a 40-foot, Coast Guard approved, dive boat is equipped with sonar for locating wrecks. During the diving season, April through November, the boat leaves twice daily, morning and afternoon, to take divers to new and varied diving experiences. The cost of going out on the boat varies from $4 to $9, depending on location. Gene Shastal, owner of the lodge, or Bill Shastal, the manager, will gladly show you the charted locations of many of the area's wrecks. Even more exciting, they will show you many unexplored areas where new wrecks are waiting to be discovered. Many wrecks have been seen from the air and there are hundreds of stories of sinkings in the area over the past 200 years, which lure divers back to this spot year after year.

On The Rocks is located in Gill's Rock, Wisconsin, at the tip of Door County, north of Green Bay. The area is known for its resort towns, each with its own bay, along the coastline with names like Sister Bay, Egg Harbor, Ellison Bay, and Bailey's Harbor. Each harbor has boating facilities and its own set of wrecks, but On The Rocks is the diving headquarters for the Door County area. Whether two or three divers, or a large group, fun and enjoyment can be found at On The Rocks. Reservations are recommended because of its popularity. For reservations, write or call: Bill Shastal, Rt. 1-Box 164 GS, Ellison Bay, Wisconsin 54210. Or telephone: (414) 854-2808.



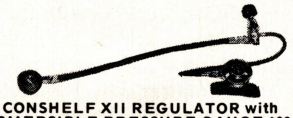
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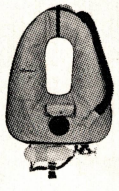


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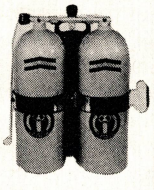
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Seacor Incorporated introduces a unique and exciting new innovation to the Underwater Television Industry that revolutionizes the visual documentation of U/W phenomena. The Sea Snoop, engineered by ENR Enterprises, provides instant training material, immediate inspection data and offers U/W television mobility never before attained.

Sea Snoop has been tested by the Navy and Brooks Institute. Seacor used it to monitor for U/W 70 mm motion picture filming for the 1974 World's Fair. Further applications could be inspections of hull, pipeline, piling, underwater training for diving and marine biology.

The hydrodynamics configuration reduces water resistance; an adjustable buoyancy control allows adjustment for positive and negative buoyancy. Playback and leak indicator are both readily visible to the operator. The Snoop allows for 30 minutes of continuous taping, is operational to 600 ft. with depth of field from six in. to near infinity.

For additional technical specifications and purchasing information, contact: Seacor, Incorporated, P.O. Box 22126, San Diego, Calif. 92122.

SCUBA

With scuba diving gaining in popularity every day, the Educational Division of North American Films, Inc., of Tarzana, started production in December of an educational film for underwater safety and physical education classes, entitled, *Scuba*. Now completed, the 20-minute film is ready for distribution for sales to schools, colleges, libraries, and other educational institutions, world-wide.

S. Richard Krown, Executive Producer for North American, stated the film is designed as a visual aid to instructors and will provide a comprehensive introduction to the sport of scuba diving.

The production of the film was assigned to documentary producer-director Richard Bansbach of Magic Film Works, himself an avid scuba enthusiast and assistant instructor. With diving instructor Kam Cooney, Bansbach works out a format in which actual scuba instruction is observed.

The learning of additional diving techniques as well as the correct use of equipment through competent instruction is stressed in the film. A scuba class is observed as they progress from the swimming pool to the ocean. The initial filming began at the West Valley YMCA pool in Reseda, California, then went to locations such as Lake Mead, Santa Barbara Island, Catalina and several Southern California beaches. On each step of the production, Bansbach worked closely with officials of the National Scuba Training Council, who are technical consultants on the film.

For information concerning this film, contact: North American Films, Inc., Tarzana, California 91356.

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cruising cay sal

By Paul Tzimoulis



It isn't often today's diver can find a piece of underwater real estate which hasn't been trampled and picked over by hundreds of divers before him. Yet there does exist a few such wilderness areas which have somehow eluded the commercial land developers and resort promoters, remaining untouched and unpolluted by man's twentieth century gold rush into the Caribbean. In fact, one such spot lies within 60 miles of the continental U.S. It's called Cay Sal Bank, and it is known by only a handful of hardy fishermen and a few dive boat skippers.

Cay Sal Bank is actually an obscure chain of limestone cays and coral reefs in the form of a triangular ring, sitting out in the middle of the open ocean. It is part of the Bahamas, but is not exactly in the Bahamas. Instead, it sits alone and apart from the Bahamas archipelago, uniquely positioned at the very crossroads between the Florida Keys, Cuba, and the Bahamas.

You cannot reach Cay Sal Bank by airplane because no airline flies there. And it wouldn't matter much if they did, for the islands of Cay Sal have no hotels, no guest houses, and no restaurants. The area is almost totally uninhabited and most certainly undeveloped. The average Miami Beach type tourist might regard such a place as desolate and inhospitable, but to the diver, Cay Sal is paradise. It is a place where the water is still pure and gin clear, where big fish roam the reefs without fear, where lobsters are still bountiful, and where the awesome feeling of wilderness still prevails.

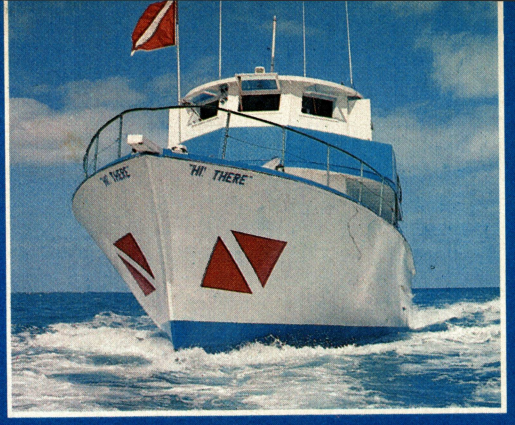


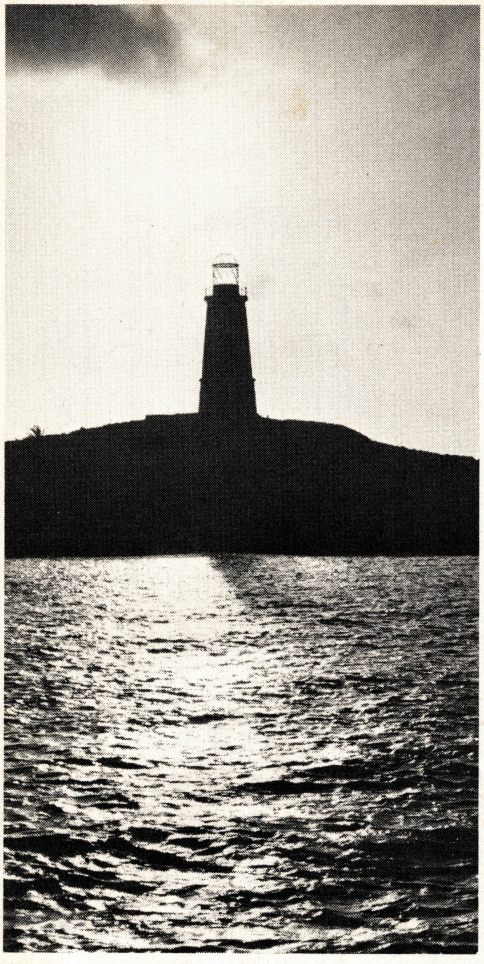
photography by Author

In addition to superb water conditions, Cay Sal Bank offers just about every kind of diving imaginable. Quiet coves and shallow sea gardens provide ideal snorkeling around many of the cays. Medium depth reefs from 30 to 60 feet offer gin clear diving and a cornucopia of marine life. Ver-

bank

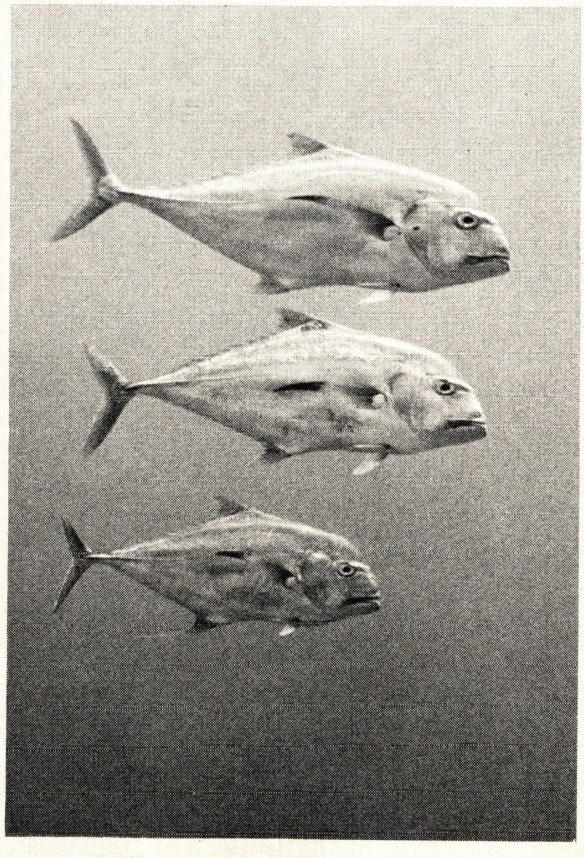
"New dive boat offers out of this world trips for Florida Keys visitors."



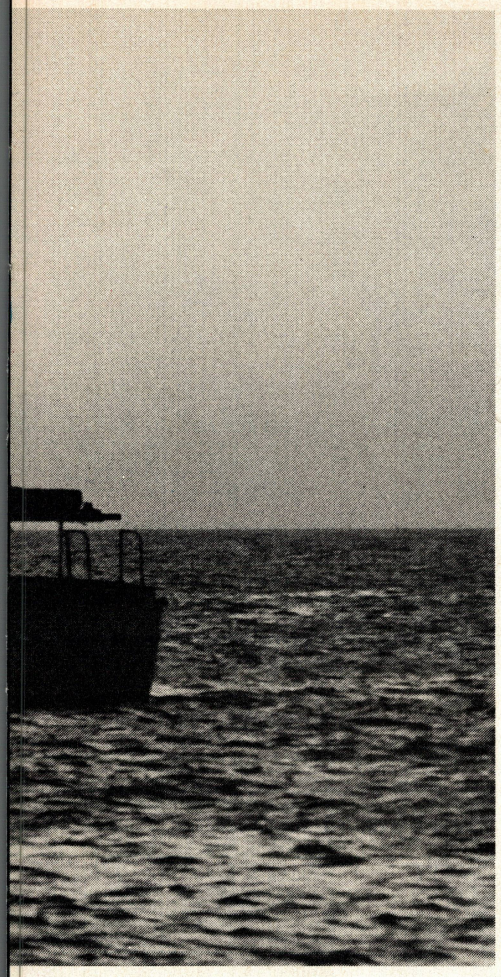


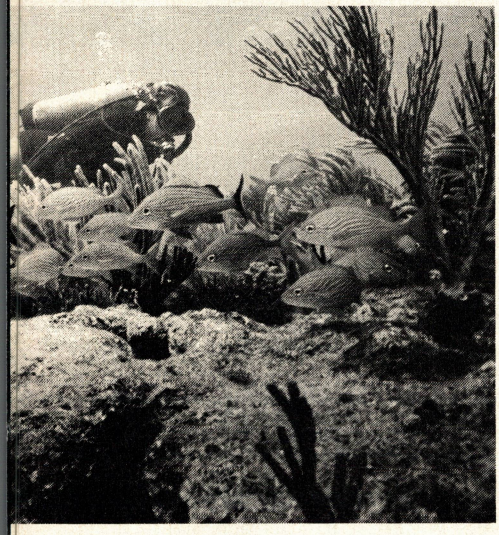


Cay Sal Bank had remained remote and inaccessible until recently when the Hi! There, *an Islamorada, Florida, charterboat began offering regular service. Customized to carry scuba divers, the boat easily accommodates 24 passengers. Top right, the* Hi! There *rides easy at anchor in the lee of Elbow Cay. The lighthouse, left, on Elbow Cay now serves as a marker for the wreck of an old paddlewheel steamer which lies just off the limestone bluff. Other dive sites are frequented – such as Ten Fathom Reef, right, and Fish City, the picture on the far right.*









gin clear diving and a cornucopia of marine life. Vertical drop-offs and sheer coral walls provide high voltage action and thrills for the experienced diver. And for the dedicated undersea explorer, there is a wide range of ocean oddities including limestone caves, blowholes, coral grottoes, shipwrecks, and ocean blue holes. In all, there are perhaps a hundred small islets, cays, and rock formations with countless coral reefs surrounding them. It is an expansive undersea formation, measuring 60 miles in length, 40 miles wide, and surrounded by deep ocean water of 1200 to 2400 foot depths.

Until recently, Cay Sal Bank had remained remote and inaccessible to all but a fortunate few divers who could afford the expense of a private charterboat trip across the Straits of Florida. It was difficult to reach, for there were no regularly scheduled trips for the individual diver. All this has changed now, as a new dive cruise boat is now offering regular service to Cay Sal Bank from Islamorada.

The *Hi! There* is a big, beefy diving charter boat measuring 65 feet in length, with a wide 20 foot beam. She weighs 47 tons gross, and she's built on a solid foundation of hand hewn oak and cypress planking. Although she is Coast Guard licensed for 48 passengers, the *Hi! There* is presently designed to carry 24 divers comfortably.

Powered by twin 850 hp International Harvester marine diesels, she can cruise at nine and a half knots with a full load. From her berth at the Holiday Isle Marina, the *Hi! There* can make it to Cay Sal Bank in approximately seven hours. As for navigation equipment, the ship's bridge is loaded with all the necessary electronic gear, including Loran radar, VHF radio telephone, citizens band radio, and a recording depth finder to detect reefs, drop-offs, and wrecks.

Customized specifically for scuba diving, the *Hi! There* has a large, ruggedly built aluminum boarding ladder on the stern. It is double the normal width and can accommodate two divers at a time. An air compressor has been installed on deck in the afterdeck, permitting convenient refilling of tanks right after the dive. The machine is an Innerspace/Poseidon 7.5 cfm compressor with maximum delivery of 3000 psi. A standard cubic foot tank can be refilled in approximately ten minutes, and there's an automatic pressure switch which cuts off at 2350 psi. A manual bypass switch permits filling aluminum tanks to their rated 3000 psi capacity. Individual tank racks along both starboard and port walkways provides secure and tidy storage for tanks not in use. The afterdeck and passenger compartments are completely carpeted for safety and comfort. Scuba equipment is stored on the afterdeck while under way, and personal clothing can be stored beneath the bunks. Sleeping accommodations are dormitory style, as on most large dive boats. There are ten bunks in the forward cabin, six in the center cabin, and eight more in the main cabin. The head is equipped with a shower, sink, and manual flush toilet.

In addition to the 24 diving passengers, the *Hi! There* carries a regular crew of three — the skipper, the mate, and the cook. The skipper, Captain Chet Bright, is an ex-Navy man with 30 years experience in handling ships. The cook, Sue Walsh, is not only a gourmet chef, but also an expert scuba diver and instructor for first aid and lifesaving. Pat Anderson, owner of the *Hi! There*, often goes along as a fourth crew member, assisting Sue with the serving of the meals.

And speaking of food, the meals served aboard the *Hi! There* are almost worth the price of the entire trip. Sue is an absolutely fantastic cook, and every dish is a work of art. Being an ex-airline stewardess, Pat recognizes the value of good meals while traveling, and she doesn't skimp one bit on the food budget. Only the finest meats and fresh vegetables are purchased.

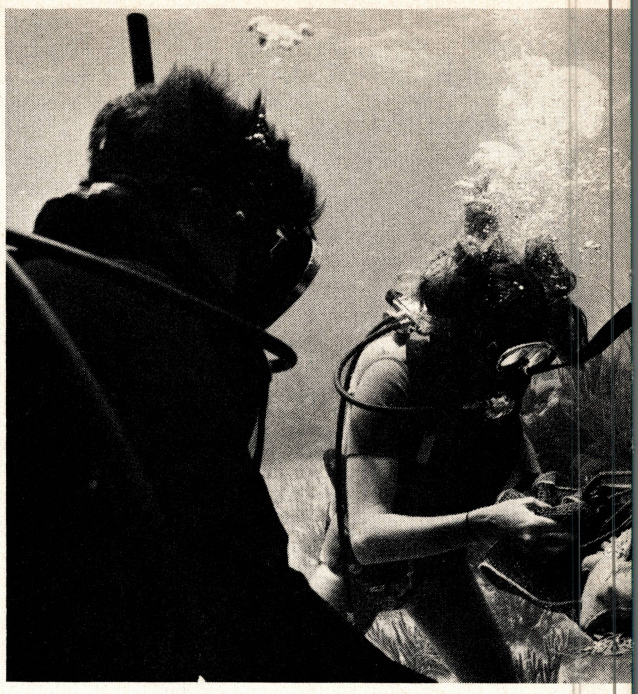
Each meal is a surprise and a delightful experience in gourmet dining. A big breakfast is served every morning to provide that much needed fuel food for the day's diving. It usually starts with orange juice, coffee, milk and tasty pecan rolls. Then comes the main serving of possibly blueberry pancakes, or French toast, or perhaps Quiche Lorraine.

Lunches are always hot meals. One day it might be giant cheeseburgers with lettuce and tomatoes. The next day it could be barbecued beef on a submarine roll, or perhaps a tuna casserole.

Dinner is, of course, the finest meal of the day. Large charcoal broiled steaks are served at least once during every cruise. Baked ham with mixed vegetables is another favorite. Another night it might be turkey stew with fresh baked bread, or perhaps an Italian style spaghetti dinner. But best of all, are incredible desserts — peach pie and ice cream, key lime cheesecake, Indian pudding with ice cream, or Sue's special. The special is called a Diver's Delight and it is an angelfood cake with alternating layers of deliciously flavored sherbet and ice cream. Second helpings are always available, and seldom does any guest complain of being underfed.

About the only thing which comes close to matching Sue's cooking is the extraordinary quality of diving. Underwater visibility is consistently 200 feet, fish appear bigger and more plentiful, and the coral reefs are like something out of a picture book! Cay Sal is the closest thing to an underwater utopia that a sport diver could ever hope for. And aboard









the *Hi! There* one has a rare opportunity to sample a wide variety of unique undersea attractions. Here is a sampling of just a few spots where the dive boat might drop anchor during a three or four day cruise . . .

FISH CITY — is an exceptionally busy reef located on the outside edge of Damas Cays. The area is loaded with schools of fish, mostly grunts, snapper and pork fish. In fact, the fish here are often so thick that you can hardly see another diver 30 feet away! It is a very beautiful reef made up of high coral heads, white sand valleys, archways, and small coral caves. Depths range from 20 to 30 feet, providing ideal conditions for either snorkeling or scuba. Tucked away among the shadowy coral crevices are big lobsters, rockfish, and grouper. And standing vigil over the entire scene is a lonely barracuda who professes occasional curiousity over the visiting divers presence. Why these fish seem to congregate in this particular spot is a mystery to all, but certainly a welcome phenomena for the sport diver.

THE RIDGE — Several miles to the east is another group of small sandy cays known as Dog Rocks. There is a unique undersea formation running straight out to sea off the southeast end of these islets. Nicknamed "The Ridge", this unusual structure takes the form of a 20 foot high razor-back coral ridge which runs in a straight line for several hundred yards. It is probably an underwater extension of the nearby land formation, but is now completely covered by a thick mask of living coral. The depth of the surrounding water averages 25 feet, with The Ridge rising sharply from a sand bottom. The top of this long coral formation is carpeted with a forest of softly swaying sea whips. These delicate gorgonian corals look much like a field of ripened wheat. The scene is punctuated by colorful colonies of yellow sea fans, beige sea plumes, and lavender corals. Although there is not as many fish here as at Fish City, the reefscape is beautiful.

THE GROTTO — Sailing southward from Dog Rocks, we come to a larger island known as Water Cays. On the north side of this island, there is a natural ocean pool carved out of solid rock. Measuring some 150 feet in diameter, the pool is filled with crystal clear sea water, with depths ranging from 5 to 20 feet. The bottom is covered with a fine white sand which provides a sparkling turquoise hue to the water. Large stone boulders lie in a jumbled heap, the obvious result of an ancient landslide. The grotto is supplied with a constant flow of fresh ocean water from two underwater tunnels which lead to open sea. The larger of the two is 30 feet in diameter and the upper porton is exposed to air at low tide. The other tunnel is ten feet high, 20 feet wide, and the outside entrance is often guarded by a large barracuda. A myriad of colorful tropical fish can be found milling around the sunken boulders. It is not unusual to find such species as squirrelfish, sargent majors, trunk fish, snapper, damselfish, young angelfish, and an occasional giant puffer fish.







Pat Anderson, the diver in the two left pictures, is the owner and sometimes crew member of the Hi! There. *In the picture closest to the left, she explores the wreckage of an unidentified paddlewheel steamer on Cay Sal Bank. Top left, a friendly grey angelfish appears as one of the regular residents seen on Ten Fathom Reef. Center, some diving guests load their goodie bags with freshly caught lobster at Damas Cay. Marine life is bountiful on Cay Sal Bank because few commercial fishermen work this area. Sea whips provide the beautiful underseascape, far right, at Ridge Reef.*

Diving the grotto is much like swimming around inside of a gigantic aquarium.

PADDLEWHEEL WRECK — Sailing still further south, we come to Elbow Cays, unmistakably marked by an abandoned lighthouse. Originally built in 1838, this sturdy stone structure served as a sober warning to passing ships until 1932 when it was declared too costly to maintain. Today, this lonely lighthouse stands as a silent monument to an unidentified ship which may have sunk more than 100 years ago. She lies in 30 feet of water close to shore, right under the lighthouse. The wreck appears to be an oceangoing paddlewheel steamer, for you can still make out the iron spokes of the paddle. She is suspected of possibly being a Civil War blockade runner, carrying supplies from the Bahamas or the Caribbean. Looking much like an underwater junkyard, the old ship's steam engine and hull structure are jumbled together in complete disarray. A long succession of violent storms has taken its toll on this once proud vessel. Much of the wreck is now covered with marine life. Fire coral and gorgonians spring up from metal beams and broken pieces of iron sheeting. The underside of these decaying structures are often coated with crimson patches of encrusting sponge. Schools of grunt and snapper hang motionless in the shadow of the ship's broken superstructure. It is an ideal setting for the underwater photographer, providing a rare opportunity for a colorful shipwreck setting.

CAY SAL WALL — One and a half miles south of Elbow Cays there is a very distinct rock formation known as Elephant Ears. About one mile seaward from this rock formation there lies one of the most spectacular drop-offs to be found in all of the Bahamas. Starting at a depth of 90 feet a sheer vertical wall of living coral plummets straight down to 180 feet. At that depth there is a narrow ledge and then the wall continues vertically downward into the abyssal deep. The upper portion of the wall is a massive bulwark of living coral. Huge trees of black coral bend gently with the current, and giant tube sponges slope outward like the trumpets of Tibet. There are sponges of every color, sprigs of brightly colored purple coral, and spreading branches of gorgonian fans. The colors span the entire spectrum from rich orange to soft grays. The wall is a living tapestry of marine life. It is here that one also finds the big fish action. Groupers weighing 30 to 60 pounds are seen on most every dive. Big snapper, jacks, and eagle rays are also abundant. One need only cruise along the wall for five minutes, and he is bound to encounter some form of fascinating marine life.

TEN FATHOM REEF — Located halfway between Elephant Ears and the Cay Sal Wall is a medium depth reef known as Ten Fathom. This formation is a gracefully shaped mound of coral some 300 to 400 feet in diameter and rising up 20 feet from the sandy bottom. Although there is no other bottom life in this area, this curious mound is thickly populated with large sponees, sea whips, sea plumes, and gorgonian fans. The sponges are perhaps the most dominant feature of this reef, for there are hundreds of them in every shape and color imaginable. Many are unusually large and strangely shaped. Visibility is breathtaking, often exceeding 200 feet. The fish life here is also very active and several platter size gray angel fish appear to be permanent residents. They are totally unafraid of divers and will often pose for the underwater photographer. Schools of big jacks randomly cruise over the reef, obviously on the prowl for food.

The number of dive spots around Cay Sal Bank goes on into infinity, and it would take a novel size book to cover them all. There are two fascinating ocean blue holes toward the middle of the Bank, and at least a dozen more unmarked shipwrecks around the outside edge. Cay Sal offers an endless variety of unique diving exploration, but it would take a lifetime to see it all.

The *Hi! There* is presently open for group charters by dive clubs, scuba instructors, or dive stores. Reservations must be made well in advance with cash deposits to confirm the booking date desired. Available dates and prices can be obtained by writing to: Ms. Pat Anderson, P.O. Box 487, Islamorada, Fla. 33036. If you happen to be in a hurry for the information, you can telephone Ed Armstrong at the Holiday Isle Dive Shop, (305) 664-4145. In addition to group charters the dive boat has several scheduled open boat trips for individual bookings. This information is also available by contacting the people mentioned above. So if you've been diving all over the Caribbean and are seeking something special or different, try Cay Sal — you won't be disappointed.

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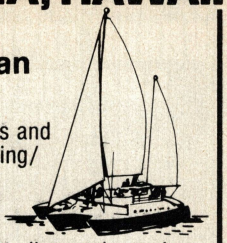
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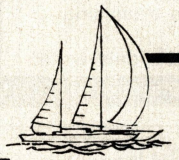
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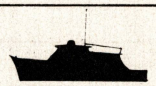
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Recently opened to diving, Drapers Reef rivals any in the West Indies. A few miles east of Port Antonio, Drapers Reef is in the lushest, most exotic part of Jamaica, where the jungled mountains meet the sea. It was from here that the English pirates sailed out against the Spanish treasure galleons.
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skin diver
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BVI PHOTO CONTEST

The First Annual British Virgin Islands Underwater Photography Contest will be held during BVI Film Festival Week, August 10-17, 1975. The contest is sponsored by the British Virgin Islands Hotel and Tourist Association.

First, second and third prizes will be awarded in each class. The closing date for entries is July 31, 1975, and the contest is now in full swing. Slides and prints will be judged and exhibited during BVI Film Festival Week, with special guest and judge, Paul Tzimoulis, publisher of SKIN DIVER.

The First Grand Prize is two weeks of diving with accommodations for one week at Little Dix Bay Hotel and one week at Peter Island Yacht Club. Diving will be provided by Dive BVI and the Aquatics Center. The Second Grand Prize is accommodations and diving for three days at both Fort Burt Hotel and Marina Cay Hotel.

Entry forms for the contest can be obtained from George Marler, Box 108, Road Town, Tortola, British Virgin Islands. The rules and categories are explained on the entry form.

PUNTA CANA CLUB

Aquatic Centers International announces the opening of their second operation in the Dominican Republic located at the Punta Cana Club.

The Punta Cana Club is a relatively new resort located on the east coast of the Dominican Republic approximately 150 miles from the capital, Santo Domingo.

The Club owns 15,000 acres of beautiful forests, dotted with fresh water spring fed pools with remarkable visibility. Eight miles of sandy beaches, interrupted here and there by rocky sea cliffs, also make up the Punta Cana property.

Twenty miles of Barrier Reef form an inside lagoon that is ideal for sailing and water skiing. A fine stable of horses to ride the many trails at Punta Cana rounds out the facilities.

The diving is superb with visibility of over 100 feet. Caves, drop-offs, coral gardens are all within 200 yards of the beach; three ship wrecks within one-half mile of the Punta Cana Club make the diving variety outstanding.

Aquatic Centers has installed 60 aluminum tanks, an Inner Space 15 cfm, 5000 psi compressor, with a Mako 3 cfm backup compressor. Over 3000 cu. foot storage tank, weights, backpacks, regulators, fins, etc., make Punta Cana one of the best equipped resorts in the Caribbean.

The Dominican Republic is just an hour and a half non-stop jet flight from Miami. For more information on individual and group rates, write: Aquatic Centers International, Max. Henrique Urena #89, (Ens. Piantini) Santo Domingo, Republica Dominicana.

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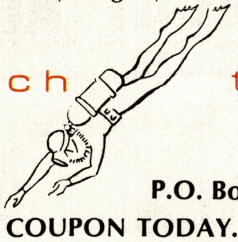


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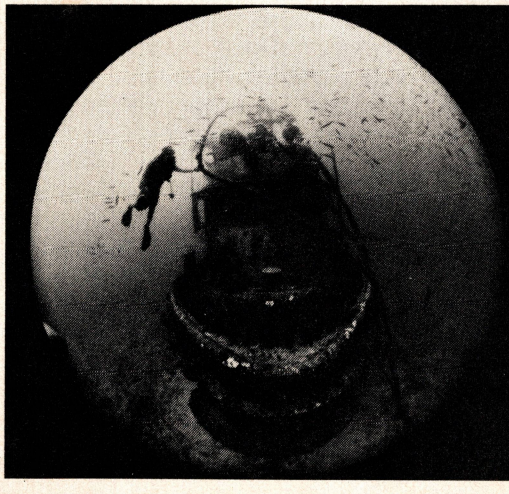
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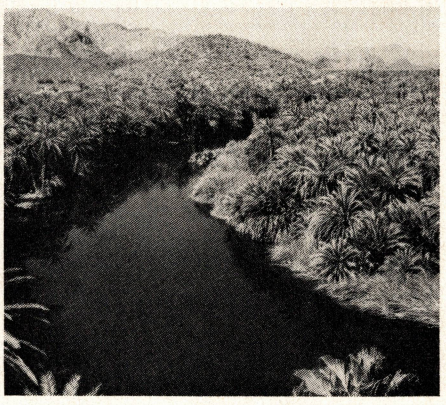
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IN AUGUST with skin diver

DIVE BAJA

Every Monday, Wednesday, Friday and Saturday a flight departs from gate seven at the Long Beach Airport Terminal Building for exotic destinations in Baja and Sonora, Mexico.

Baja Airlines, the operators of these flights, serve the cities of Bahia de Los Angeles, Punta San Francisquito, Mulege, San Felipe, and Loreto in Baja and Guaymas, Kino and Puerto Penasco in Sonora.



The airline goes one step beyond just selling air fare and offers package vacations such as: $224 to Mulege for four days, including roundtrip air fare, air conditioned hotel room, three meals per day, Mexican tourist card, and room tax. The airline does have a low baggage allowance, so it is necessary to rent equipment upon arrival. Only Mulege, Guaymas and Kino have air compressors available.

Baja Airlines has set up special dates in the future for dive packages. They are: August 6-9 to Kino for $230/person; July 18-21 and September 12-15 to Mulege for $250/person. The dive packages include roundtrip air fare from Long Beach, air conditioned hotel room, three meals per day, Mexican tourist card, two full days of diving off a cabin cruiser, as many tanks as you think you can use in a day, backpack, belt, weights, and diving guide. There are also non-diver prices.

Starting in October of this year Baja Airlines will offer a very unique vacation. An 80-foot motor yacht will be placed in the Bahia de Concepcion just below Mulege, Baja. The yacht will have four private cabins for couples, a large diving saloon, bar, expert cook and captain, skiffs to go fishing or diving with. The yacht will be a floating hotel in the most beautiful bay in Baja. The airline will offer a package of air fare, bunk, meals and tourist card for four or five days.

Baja Airlines has been in operation now for three years using twin engine, ten seat, 200 mph Cessna 402's and Beechcraft D-18's, and has transported thousands of vacationers.

For literature on the above different packages, write to: Baja Airlines, 4100 Donald Douglas Drive, Long Beach, Calif. 90808. Telephone: (213) 429-2454.

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See the California nobody knows on a seven-day oceanographic cruise through the six northern Channel Islands situated off the coast of Southern California. The cruises, sponsored by the U.S.C. Sea Grant Institutional Program, provide a rare opportunity for young and old alike to visit nearly pristine environments.

Two days will be spent exploring the interior of Santa Catalina, examining its peculiar insular ecology and walking through its unusual geology trying to picture how the early Californian Indians traveled from island to island.

While sailing onboard the *Fury II*, a floating laboratory especially equipped to sample the oceanic environment, you will experience a squid watch, dive and snorkel in yet undisturbed waters and, with the help of trained biologists onboard, gain a new appreciation for your environment.

Two cruises are scheduled for this coming summer — July 22-28 and August 1-7. The fee of $305 (everything included) is tax deductible for professionals and teachers improving or maintaining their skills. For information, call (213) 746-6068, or write: Sea Grant, SSW 308, University of Southern California, Los Angeles, Ca. 90007.

GALAPAGOS DIVING

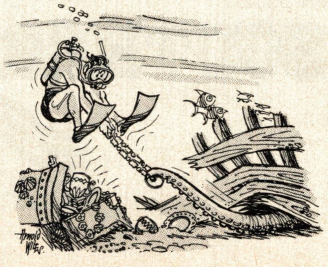
Dive with penguins, iguanas, sea lions, cormorants and a rich tropical fish population. The Galapagos Tourist Corporation is now offering unique 12-day diving cruises of the "Enchanted Isles" with See & Sea Travel Service.

Using two motor yachts, the diving cruises cover the entire archipelago and licensed naturalist guides accompany each group. A diver/master host of See & Sea will lead the 14 person groups on July 9 and August 13, 1975.

The 60-foot, eight passenger yacht *Laura Maria* and the 56-foot, six passenger yacht *Cathchar* are completely equipped for diving cruises with compressors, 3300 psi aluminum tanks, packpacks and weights. Divers need only to bring their personal gear.

Since Charles Darwin visited the Galapagos Islands in 1835, they have been acclaimed as the world's foremost wildlife laboratory. The undersea life is as spectacular and unusual as the terrestrial creatures.

Small group charters are also available throughout the year by contacting See & Sea, at: 680 Beach St., Suite 340, San Francisco, California 94109.





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Some people call the Caymans the best diving in the Caribbean. A lot of people call the Caymans the best diving in the world.

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The Cayman Islands

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Please send me your brochure that tells the whole beautiful story about the Caymans.

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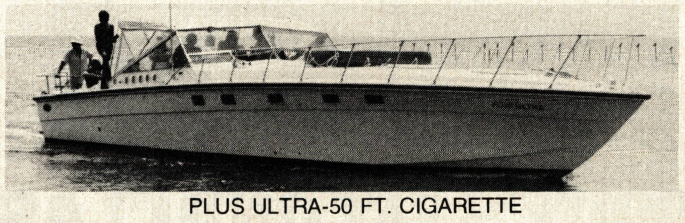
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Now we've got special diving package plans starting at just $220 for 7 days/6 nights. Our round-trip Grand Flight leaves for the island every afternoon at 1:45 p.m., and from now until December 15, 1975, we're offering a variety of special diving package plans. Each one includes 7 days/6 nights, at prices from $220 to $356 per person, depending on the accommodations and extras you'd like. Air fare is not included.

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Southern

Dive Tour News

July 3, 10, 17, 24, 31 — KONA, HAWAII — Fair Wind, See & Sea Travel, San Francisco, Calif.
July 4, 11, 18, 25 — BONAIRE — 8 days, Lislind Int'l, New York, N.Y.
July 4 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
July 5 — COZUMEL — 8 days, John Reseck, See & Sea Travel, San Francisco, Calif.
July 8, 22 — TORTOLA, BVI — 13 days, Trimarine Misty Law, St. Thomas, Virgin Islands
July 8, 17, 25 — FREEPORT — 7 days, Skeet LaChance, Adv. Cruises, Ft. Lauderdale, Fla.
July 10 — VIRGIN ISLANDS — 12 days, Sierra Club Outings, San Francisco, Calif.
July 11—ROATAN, HONDURAS—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
July 11 — BONAIRE — 8 days, Happy Wanderer, Bronxville, N.Y.
July 12 — JAMAICA — 7 days, Elmer's Watersports Inc., Evanston, Ill.
July 12, 26 — BAHAMAS — 7 days, Tropic Diving Cruises Inc., Ft. Lauderdale, Fla.
July 12, 26 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
July 12 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
July 12 — BONAIRE — 9 days, Hank Ketels, See & Sea Travel, San Francisco, Calif.
July 13 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
July 18 — MULEGE, BAJA CALIF. — 4 days, Club Baja California Inc., Long Beach, Calif.
July 19 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
July 24 — MAUI-LANAI, HAWAII — 12 days, Sierra Club Outings, San Francisco Calif.
July 27 — CAY SAL — 7 days, Scuba Tours, Fairfax, Virginia.
July 27 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
Aug. 1—VIRGIN GORDA, V.I.—12 days, Sunland Int'l Tours, Beverly Hills, Calif.
Aug. 1, 8, 15, 22, 29 — BONAIRE — 8 days, Lislind Int'l, New York, N.Y.
Aug. 2 — NORTH ELEUTHERA — 7 days, Scuba Tours, Fairfax, Va.
Aug. 2, 23 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
Aug. 3, 17, 31 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
Aug. 4 & 25—COZUMEL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
Aug. 5 — CARTAGENA, COLOMBIA — 10 days, Sunland Int'l Tours, Beverly Hills, Calif.
Aug. 5 — KONA COAST, HAWAII — 10 days, Sierra Club Outings, San Francisco, Calif.
Aug. 5, 19 —TORTOLA, BVI — 13 days, Trimarine Misty Law, St. Thomas, Virgin Islands
Aug. 6 — LORETO, BAJA CALIFORNIA — 4 days, Club Baja California Inc., Long Beach, Calif.
Aug. 7, 14, 21, 28 — KONA, HAWAII — aboard Fair Wind, See & Sea Travel, San Francisco, Calif.
Aug. 8 — NASSAU — 14 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
Aug. 9, 23 — BAHAMAS — 7 days, Tropic Diving Cruises Inc., Ft. Lauderdale, Fla.
Aug. 9 — COZUMEL — 8 days, See & Sea Travel, San Francisco, Calif.
Aug. 15 — ROATAN — 14 days, Arthur Sams, Explorer Council, Los Angeles, Calif.
Aug. 16 — BONAIRE — 9 days, John Kelly, See & Sea Travel, San Francisco, Calif.
Aug. 16, 30 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
Aug. 16 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
Aug. 17 — BAJA CALIFORNIA — 6 days, Sierra Club Outings, San Francisco, Calif.
Aug. 17, 24, 31 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
Aug. 18 — ELEUTHERA — 7 days, Happy Wanderer, Bronxville, N.Y.
Aug. 21 — HAWAII — 10 days, Arnold Stollar & Roy Damron, UNEXSO, Pompano Beach, Fla.
Aug. 22 — CHINCHORRO REEF — 13 days, Sunland Int'l Tours, Beverly Hills, Calif.
Aug. 22 — HAWAII/ALL ISLANDS — 10 days, U/W Explorers Society, Freeport, Grand Bahama
Aug. 22 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
Aug. 25 — NASSAU — 7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
Aug. 30 — JAMAICA — 7 days, Elmer's Watersports, Inc., Evanston, Ill.
Sept. — LAKE SINOIA, RHODESIA, SOUTH AFRICA — 21 days, Ruth Fry Exp., Norristown, Pa.
Sept. 2, 16, 30 — TORTOLA, BVI — 13 days, Trimarine Misty Law, St. Thomas, V.I.
Sept. 4, 11, 18, 25 — KONA, HAWAII — aboard Fair Wind, See & Sea Travel, San Francisco, Calif.
Sept. 5, 12, 19, 26—BONAIRE—8 days, Lislind Int'l, New York, N.Y.
Sept. 5, 15—BIMINI—7 days, Adventure Cruise, Capt. Skeet LaChance, Ft. Lauderdale, Fla.
Sept. 6, 19 — BAHAMAS — 7 days, Tropic Diving Cruises Inc., Ft. Lauderdale, Fla.
Sept. 6 — COZUMEL — 8 days, See & Sea Travel, San Francisco, Calif.
Sept. 6 — CAYMAN/ROATAN — 12 days, See & Sea Travel, San Francisco, Calif.
Sept. 12 — MULEGE, BAJA CALIFORNIA — 15 days, Club Baja California, Long Beach, Ca.
Sept. 13—ROATAN—8 days, Go Mexico, Inc., Minneapolis, Minn.
Sept. 14—COZUMEL—8 days, Go Mexico, Inc., Minneapolis, Minn.
Sept. 16—CARTAGENA, COLOMBIA—10 days, Sunland Int'l Tours, Beverly Hills, Calif.
Sept. 20 — BONAIRE — 9 days, See & Sea Travel, San Francisco, Calif.
Sept. 20—SAN ANDRES—8 days, Go Mexico, Inc., Minneapolis, Minn.
Sept. 22 — GRAND CAYMAN/IQ7 — 7 days, Horizons Int'l, Seattle, Wash.
Sept. 26—COZUMEL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
Sept. 28—BELIZE—7 days, Go Mexico, Inc., Minneapolis, Minn.
Sept. 29 — CABO SAN LUCAS — 5 days, Sunland Int'l Tours, Beverly Hills, Calif.
Sept. 29—FLORIDA KEYS, KEY LARGO—7 days, Fred Calhoun's U/W Safaris, Boston, Mass.
Sept. 29—PALM BEACH SHORES—5 days, Fred Calhoun's U/W Safaris, Boston, Mass.
Oct. 2, 9, 16, 23, 30 — KONA, HAWAII — Fair Wind, See & Sea Travel, San Francisco, Calif.
Oct. 3, 10, 17, 24, 31—BONAIRE—8 days, Lislind Int'l, New York, N.Y.
Oct. 4, 18 — BAHAMAS — 7 days, Tropic Diving Cruises Inc., Ft. Lauderdale, Fla.
Oct. 4, 25—SAN ANDRES—8 days, Go Mexico, Inc., Minneapolis, Minn.
Oct. 4—ROATAN—8 days, Go Mexico, Inc., Minneapolis, Minn.
Oct. 5, 19—COZUMEL—8 days, Go Mexico, Inc., Minneapolis, Minn.

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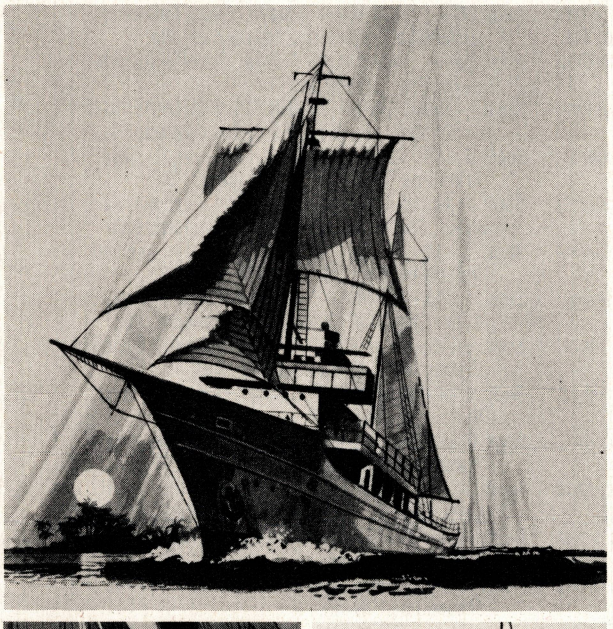


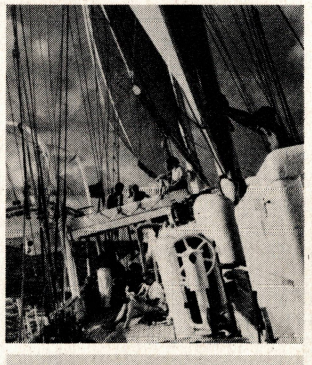
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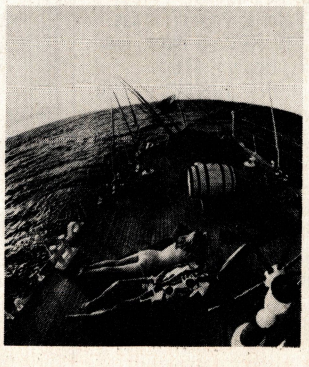
That's everything.

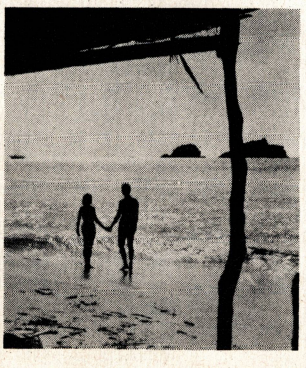
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Dive Tour News

Oct. 11 — AQABA, JORDAN — 15 days, John Clark, See & Sea Travel, San Francisco, Calif.
Oct. 11 — COZUMEL — 8 days, See & Sea Travel, San Francisco, Calif.
Oct. 14 — TORTOLA, BVI — 13 days, Trimarine Misty Law, St. Thomas, Virgin Islands
Oct. 18 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
Oct. 18 — BONAIRE — 9 days, See & Sea Travel, San Francisco, Calif.
Oct. 19—BELIZE—7 days, Go Mexico, Inc., Minneapolis, Minn.
Oct. 21 — AUSTRALIA/CORAL SEA — 17 days, Al Giddings, See & Sea, San Francisco, Calif.
Oct. 24 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
Oct. 27—CABO SAN LUCAS—5 days, Sunland Int'l Tours, Beverly Hills, Calif.
Nov. 1, 15, 29 — BAHAMAS — 7 days, Tropic Diving Cruises Inc., Ft. Lauderdale, Fla.
Nov. 1, 22—ROATAN—8 days, Go Mexico, Inc., Minneapolis, Minn.
Nov. 2, 23—COZUMEL—8 days, Go Mexico, Inc., Minneapolis, Minn.
Nov. 6, 13, 20, 27 — KONA, HAWAII — aboard Fair Wind, See & Sea Travel, San Francisco, Calif.
Nov. 7, 14, 21, 28—BONAIRE—8 days, Lislind Int'l, New York, N.Y.
Nov. 8, 22 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
Nov. 8, 22—SAN ANDRES—8 days, Go Mexico, Inc., Minneapolis, Minn.
Nov. 9, 23—BELIZE—7 days, Go Mexico, Inc., Minneapolis, Minn.
Nov. 14 — ST. THOMAS — 7 days, Happy Wanderer, Bronxville, N.Y.
Nov. 21—COZUMEL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
Nov. 22 — COZUMEL — 8 days, Les Newport, See & Sea Travel, San Francisco, Calif.
Nov. 24 — CABO SAN LUCAS — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
Nov. 29 — JAMAICA — 7 days, Elmer's Watersports, Inc., Evanston, Ill.
Dec. 4, 11, 18, 25 — KONA, HAWAII — aboard Fair Wind, See & Sea Travel, San Francisco, Calif.
Dec. 5, 12, 19, 26—BONAIRE—8 days, Lislind Int'l, New York, N.Y.
Dec. 6, 20, 27—SAN ANDRES—8 days, Go Mexico, Inc., Minneapolis, Minn.
Dec. 7, 21, 28—COZUMEL—8 days, Go Mexico, Inc., Minneapolis, Minn.
Dec. 13, 27 — BAHAMAS — 7 days, Tropic Diving Cruises Inc., Ft. Lauderdale, Fla.
Dec. 13—ROATAN—8 days, Go Mexico, Inc., Minneapolis, Minn.
Dec. 14, 21, 28—BELIZE—7 days, Go Mexico, Inc., Minneapolis, Minn.
Dec. 20 — CAYMAN ISLANDS — 10 days, Christmas special, See & Sea, San Francisco, Calif.
Dec. 20 — COZUMEL — 10 days, Christmas special, See & Sea Travel, San Francisco, Calif.
Dec. 25 — KONA, HAWAII — 7 days on Fairwind, The Dive Shop, Leawood, Kan.
Dec. 26 — BONAIRE — 8 days, Happy Wanderer, Bronxville, N.Y.
Feb. 13 — BONAIRE — 8 days, Happy Wanderer, Bronxville, N.Y.
Mar. 5 — BERMUDA — 8 days, Happy Wanderer, Bronxville, N.Y.

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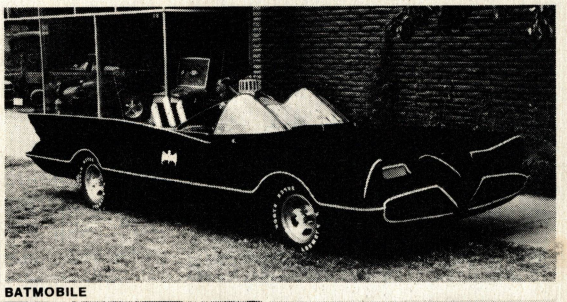
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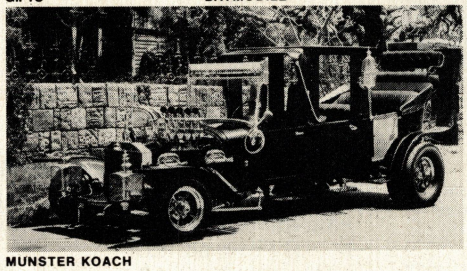
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U/W PHOTOGRAPHY HOME COURSE



How would you like to take a complete course in U/W photography without attending a single class and without traveling long distances to practice your picture taking? A new underwater photography program has been developed by a division of a Chicago-based diving instruction company to help you take good pictures the first time you bring a camera underwater.

The program teaches certified divers who have almost no photographic experience above water or underwater as well as those divers who feel they could take better U/W pictures if they received some practical guidance.



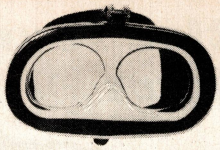
The faculty for underwater photography program includes professionals in underwater photography, diving and education like Tom Gibbs, Tom Stack, Mike Foley, Dick Jacoby, president, and Pete Wegman.

The Underwater Photography Program is organized into 24 learning units which are divided into four 8½ by 11 inch volumes. The text is filled with practical information, beginning with photographic basics and working up through modern specialized techniques. Students will receive one volume at a time, and the program is arranged so that the next volume will arrive just as soon as the student completes all the assignments in the previous one.

Dozens of color photographs, and hundreds of black-and-white pictures, diagrams and illustrations supplement the easy-to-read text.

The program's 17 assignments begin with photographic planning and end with shooting and editing a series of U/W pictures to create a complete story. Along the way the student will learn basic and advanced techniques for taking above water and U/W pictures with

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both available light and artificial light. Students will also practice U/W photo techniques such as macro and infra-red, and they will learn about useful darkroom tricks.

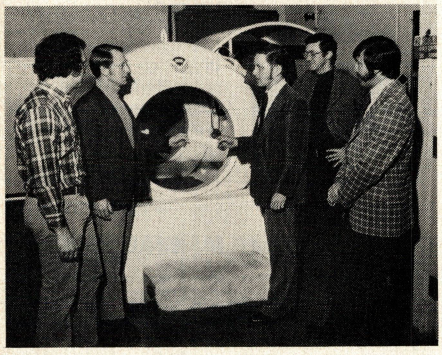
A large Chicago camera-equipment retailer will rent any or all of the equipment required for the course to anyone in the U.S. or Canada.

Students may take up to two full years to complete the individualized learning program in their leisure time, and there is a moneyback guarantee of the $350 tuition if anyone wishes to return the course material within ten days. A course diploma and a NAUI sanctioned certificate of completion of an U/W photography specialty course will be awarded when a student finishes the program.

For more information about this easy way to learn U/W photography, write: The Creative Whale, P.O. Box 6280, Chicago, Illinois 60680.

U OF MICHIGAN PROJECT

William Romanski, president of the Michigan Skin Diving Council representing 29 state diving clubs, recently presented a $3000 check to the University of Michigan's Underwater Operations Project to be used toward the purchase of a new and larger hyperbaric chamber. This additional chamber will act as a support unit for the present chamber and will assure council divers access to a chamber in the event of an accident.

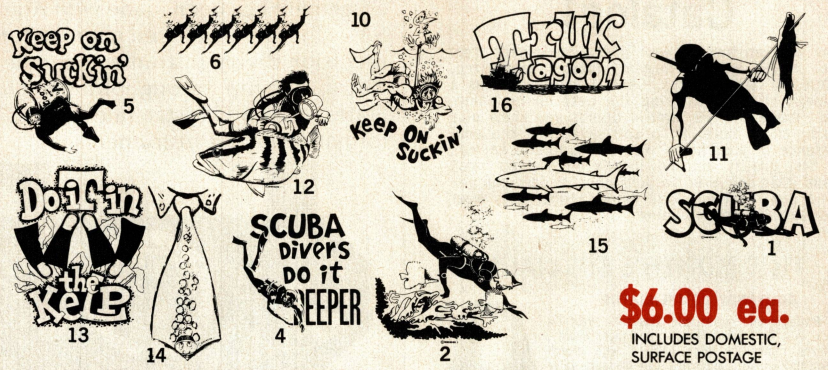


The present hyperbaric unit at the University is one of only six operational chambers in the midwest. According to Lee H. Sommers, director of the underwater technical lab, the U of M chamber has already been credited with saving five lives.

The unit now in operation, was originally acquired by the University through the National Sea-Grant Program, National Oceanic and Atmospheric Administration. A medical staff responsible for its function is provided by the Pulmonary Division of the UM Medical Center.

Emergency service can be obtained anywhere in Michigan by contacting the State Police Operations Office in Lansing. A helicopter pad is located near the chamber facility. For additional information, contact: H. Stearns, Director Ford, Sea-Lancers, 44549 Clare Blvd., Plymouth, Michigan 48170.

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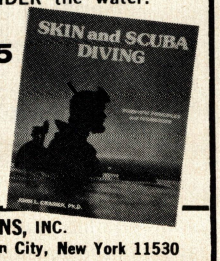
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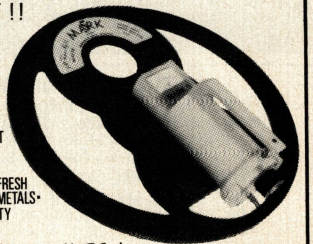


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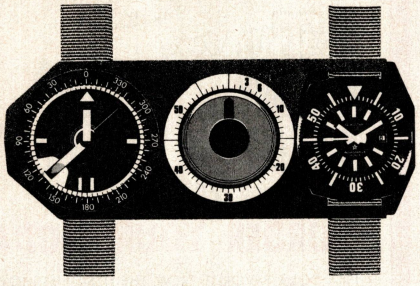
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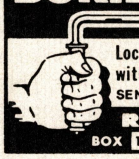
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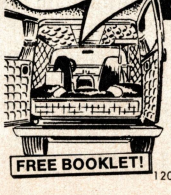
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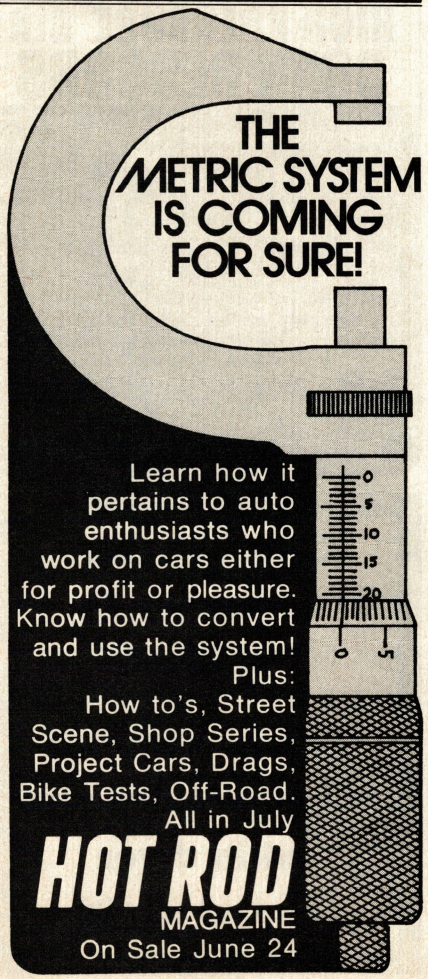
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This new city that the two firms plan to construct amidst the predominantly barren Santa Monica Bay will be the largest manufactured underwater reef in the world, the durability of which will outlast already attempted reefs. This reef, when completed, will house some six and one half million marine species, including lobster and abalone.

This reef will begin dimensionally at two miles in length and a half mile wide, the construction pattern of which will resemble checkerboard-placed pyramids like separate submerged buildings. Research studies prove that this pattern will not interfere with normal water and sand flow, nor hinder the existing minimal marine life.

The reef will provide safe haven for the smaller marine species that are unable to survive in a barren environment, thus minimizing a food chain. Smaller reefs have been constructed along the California coast that have substantiated the theory of thigmotropism, the natural tendency of marine organisms to adhere to solid submerged matter and therefore create a food chain.

Project feasibility depends on the established abundance of used concrete traffic throughout the greater Los Angeles area. City ordinances prohibit the use of concrete segments and similar material in landfill operations within the city because it is "fluid" and does not easily withstand earthquake movements. As a result, local contractors are forced to haul to dumpsites outside the city. The transportation cost is high as are the dumping fees.

This is where Sea Reefs and Chatsee-ee enter. They will provide an ecological, easily accessible recycling station, instrumental as a landfill outlet as well as a slip site for the transportation vessel, thus providing the ideal unloading spot with costs ranging substantially lower than what it has been costing contractors at dumpsites.

State agencies and U.S. agencies have endorsed the project. Construction will be at no expense to the city of Santa Monica and Los Angeles.

The active support of every sportsman, individually or in groups, is essential to the success of this planned gift to all California which, if paid for, would cost 8½ million dollars.

For more information concerning this project, contact: Sea Reefs-Chatsee-ee, Inc., P.O. Box 9953, Marina del Rey, California 90291.

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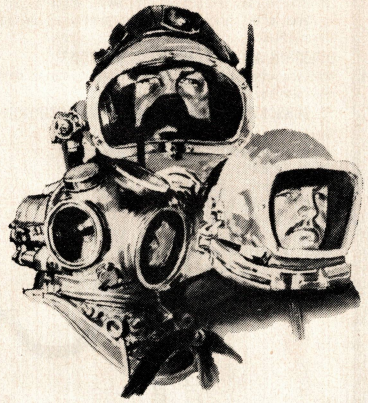
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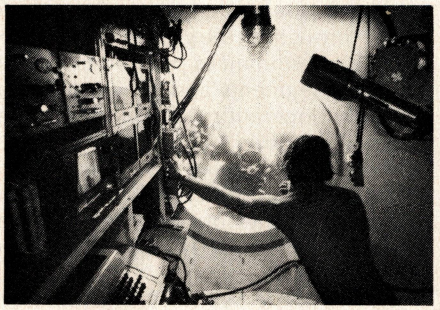
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DEEPER WITH AIR

BY IAN G. KOBLICK

Diving has been a means of exploring the ocean, and for more than 100 years men have wandered in the oceans and had air supplied to them. During this time, divers have learned that problems developed when they stay on the bottom too long or venture too deep. One of these problems, called rapture of the deep or martini's law, starts at about 100 feet. The diver begins to act drunk and the narcotic effect increases with depth until the diver is unable to control his actions, sometimes resulting in his death. The increased pressure of nitrogen in the diver's air causes a narcotic effect on him. Consequently, the rule of thumb for safe working limits for air diving is established at about 150 feet. Deeper than that, gases, other than nitrogen, has to be mixed with O_2 in order to eliminate the narcotic effect. For these deep dives, helium is usually used as the mixing gas in place of nitrogen. The helium eliminates the martini effect, but it is expensive to buy, hard to transport and causes other problems such as loss of body heat, unintelligible speech (Donald Duck effect), and requires special and expensive hardware to keep it from leaking.

A program was initiated to try to make scientific working dives easier, cheaper, longer, safer and with shorter decompression times. The program was so successful that the technique now shows prospects for commercial diving as well as scientific.



Two 14-day saturation dives, fondly called the PRUNE series (Puerto Rico Undersea Nitrogen Excursions), were carried out by the Marine Resources Development Foundation (MRDF) and the U.S. Department of Commerce, Manned Undersea Science and Technology (MUS&T) Office.

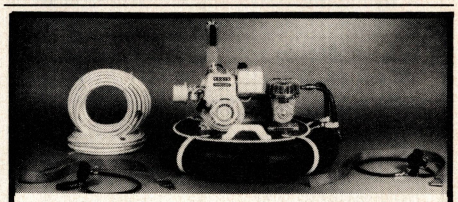
MUS&T, the agency in charge of the U.S. civilian manned undersea programs, contracted Union Carbide Corporation to carry out preliminary chamber tests for excursions from saturation at various depths.

Barely two months after the chamber tests were completed, the first aspect, the upward excursions, of the new tables were ocean tested. No bends were noted during the excursions although some slight niggles were felt by one of the divers during several of the excursions.

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Aquanauts during training for deep excursion. D. Allan Waterfield, University of New Hampshire; Dr. James W. Miller, Deputy Director, MUS&T, NOAA; Michael O. Sheen, MRDF staff; and Ian G. Koblick, the MRDF president.

The lack of narcosis or bends problems, from either being saturated at 95 feet or from making excursions up to 25 feet, validated, to their satisfaction, the chamber tests and gave them confidence that they should attempt a second dive which would test the downward excursion limits of air diving. The divers were saturated at 105 feet on N_2O_2, and they made daily excursions to increasingly deeper depths, with decreasing stays at each depth. All excursions were no decompression dives from the saturated depths. Only one diver was effected by narcosis, and it was discovered that he was normally effected by narcosis at 150 feet when doing routine surface dives.

Due to the success of the two test dives, we can arrive at the following conclusions: Men can live and work while saturated at a depth of 100 feet on a N_2O_2 breathing mixture of 5% O_2 and 95% N_2 with no detrimental effect due to nitrogen narcosis. He can make downward excursions breathing air and do hard physical work to depths of 275 feet without the effects of nitrogen narcosis hampering his working ability or judgment. Although the diver can work deep without daily decompression, he could also surface from his storage depth momentarily in an emergency situation.

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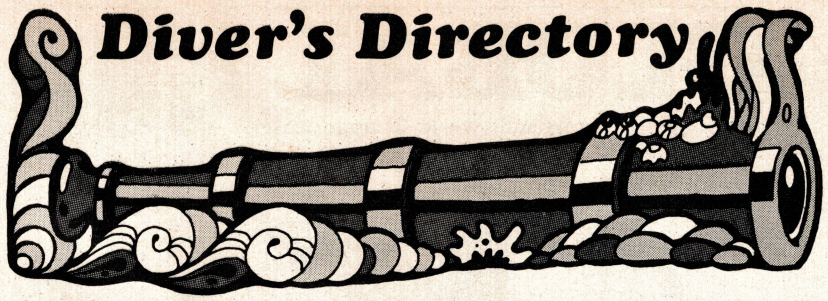


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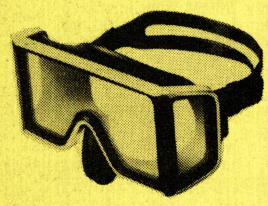
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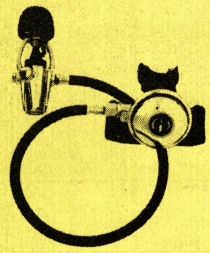
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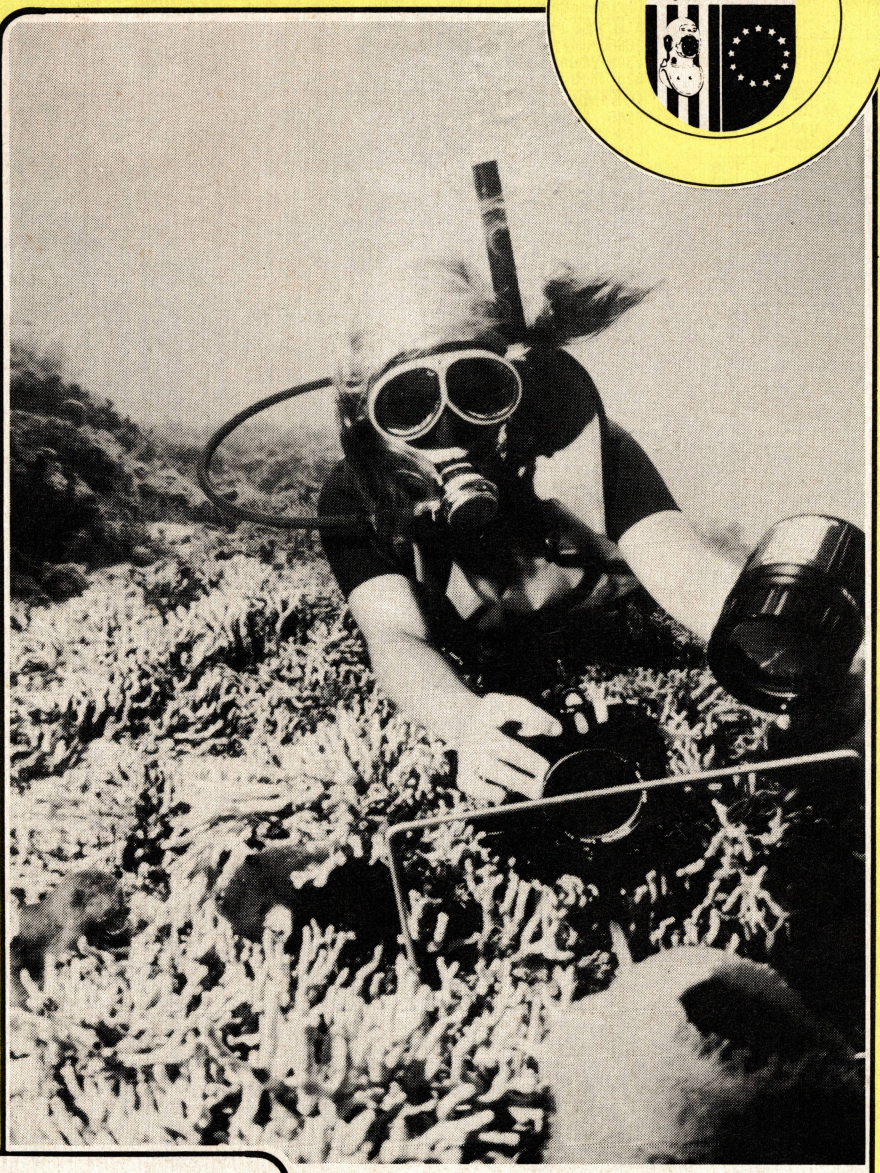
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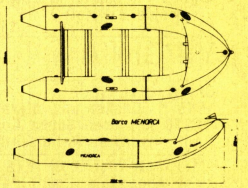


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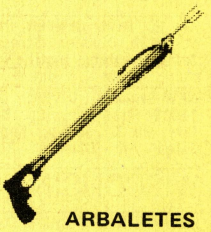


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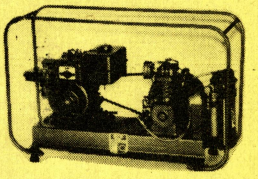
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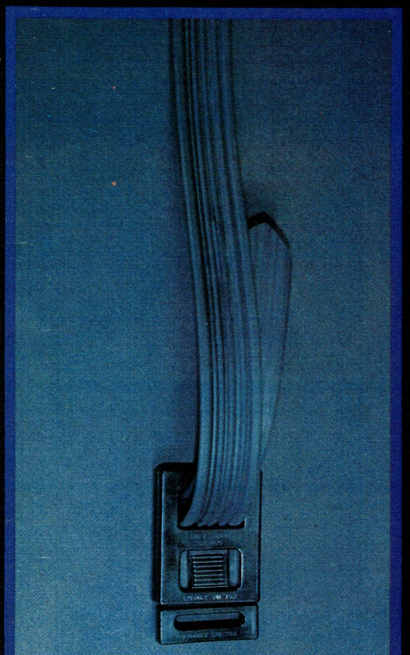
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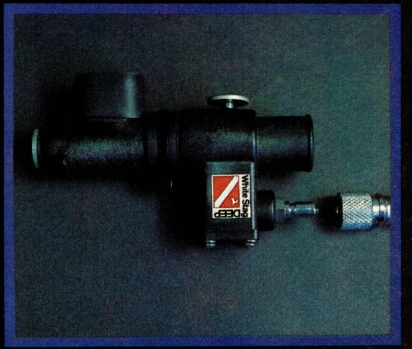




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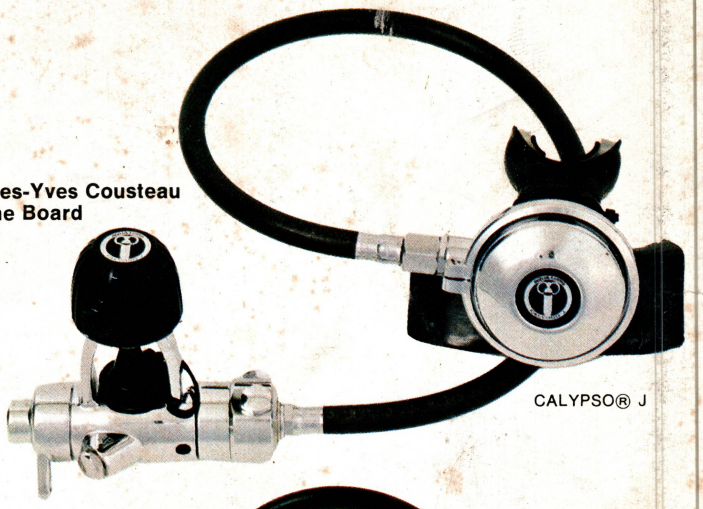


Captain Jacques-Yves Cousteau
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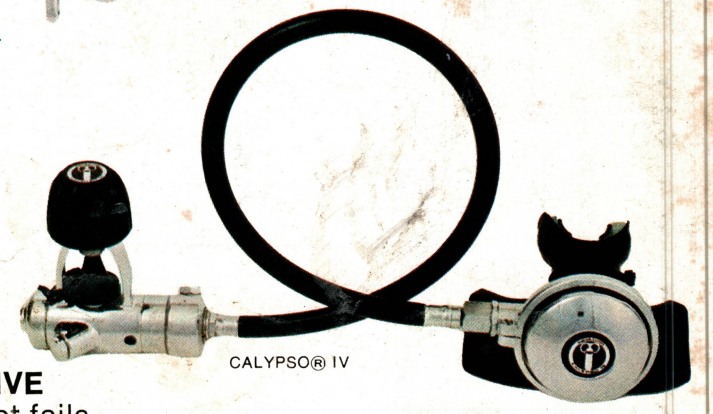
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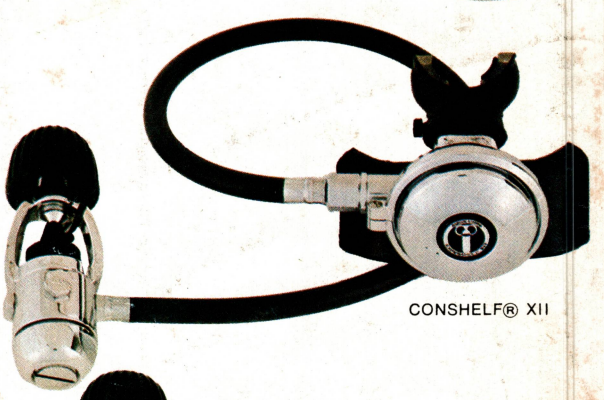


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